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ABSTRACT

Sixteen articles relating to preschool nutrition education programs, food habits and nutrient intake of preschoolers, parent education, and training of day care personnel are included in this monograph. Also included are more than fifty evaluative reviews and abstracts of articles, books, pamphlets, and audiovisuals useful as resources and/or teaching materials. Most of the compilation has been published previously in the "Journal of Nutrition Education." (Author/MP)

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Preschool Nutrition Education Monograph

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INTRODUCTION

This compilation contains a selection of items highly useful to teachers, students, parents, and others who are interested in the nutrition education of preschool children. Articles included are on the topics of food habits and nutrient intake of preschool children, preschool nutrition education programs, reaching the parents of preschool children, and training for day care personnel. Also included in this collection are reviews and abstracts of articles, books, pamphlets, and audiovisuals useful as resources and/or teaching materials. Each item appearing in this publication has either been reviewed or written by qualified nutritionists and all are considered reliable. Although by no means exhaustive, this compilation does reflect a wide range of current activities and thinking concerning this topic.

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Society for Nutrition Education, 2140 Shattuck Ave., Suite 1110, Berkeley, CA 94704, November 1978. Additional copies of this publication may be ordered for $4.50 from the Society.

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FOOD ACCEPTANCE, A CHALLENGE TO NUTRITION EDUCATION—A Review

J. Nutr. Ed., 1(2):20-22, Fall, 1969

Mina W. Lamb

Why people accept some foods and reject others has been studied rather extensively. The findings contained in this review should be an aid in any nutrition education program.

The 1965 USDA survey of household food consumption revealed that the number of Americans whose diets could be classed as good in overall nutritive value dropped to 50 per cent from the 60 per cent reported in the 1955 survey.

In recent months, news reports directed public attention to charges of hunger and malnutrition in various areas of the nation. Facts indicate that poor diets occur at each income level with four times as many occurring in households at lower income levels.

Former Agriculture Secretary Freeman stated last year that "to have poorly nourished citizenry at a time when the United States carries such heavy world responsibilities could have grave consequences. This would be particularly unfortunate when we enjoy both agricultural abundance and affluence—when our principal problem is to use well what we have."

We have food but some eat poorly; we have 12 years of public schooling but significant numbers of students fail to learn to apply concepts of diet which determine their health and, later on, the health of their children.

Scope of the Problem

The purpose of this review is to assess current research in such a way that nutrition education can have meaningful influence in improvement of the nutritional status of Americans.

Undoubtedly, many underlying factors influence dietary practices. During World War II, many disciplines, including the military, investigated who ate what, when and how much. Research tried to identify parameters involved with those who deviated from a prescribed standard of eating.

Certain parameters which were identified are challenges to those who believe that education should be a means to achieve desirable human behaviour. If a man has certain basic knowledge, it is comparatively easy to inform him through educational techniques about the performance of an atomic-powered device; his racial, cultural, religious, socio-economic and personal preferences are not involved.

Adelson[1] stated "The 1965 nationwide survey underscored the need for nutritionists to intensify nutrition education programs." Naturally, several avenues can be pursued.

The nutrition educator may encounter many obstacles in the potential learner who refuses to apply nutrition information to choices he makes at lunch or for between-meal eating. The teacher who sees students violating carefully presented concepts of dietary control knows frustration. An understanding of food acceptance and aversion would be an initial step to a constructive educational program to improve nutritional status of Americans.

Total Research Team Approach

Nutrition is not only the domain of the biochemist; social aspects of nutrition involve the psychologist, the anthropologist, the entire field of allied health specialists, the food chemist, the food processor, the advertising agent and the market researcher.

The home economists, dietitians and family counselors must cooperatively assume responsibility with the above specialists for the eradication of malnutrition in an affluent society.

They must rely on research and judgement from all specialists in these fields to achieve the desired goal. Yudkin,[2] defining the objective of a symposium on *Changing Food Habits* urged the participants to "convey an interest both in the ways in which food habits were changing and in the methods which might be effective in inducing desired change." The symposium demonstrated this team concept by the presentation of eight papers giving "advice not only from social scientists engaged in academic studies but also from those in contact with the market place."

Many people accept the idea that what they like must be what they need and that appetite is a reliable indicator of physiological need. Only the pessimist holds the dim view that everything he likes is either fattening or immoral.

From the viewpoint of the educator and nutritionist, the challenge is how to make food wants coincide with nutritional needs and how to do this early in childhood when attitudes and habits are formed and nutrient needs are most crucial. Children learn food habits from parents and others including what is considered edible and even when to eat it, according to Mead.[3] The use of food is identified—to relieve hunger, to cement friendship, to celebrate, to honor someone, to punish, and to attract attention by "hunger strikes."

Mead further stressed that only the 20th Century has available the science of nutrition and the behavioral sciences to direct the development of food habits. People in greatest danger today are those in transition—deprived new immigrants to a culture vastly different from their tradition.

Early Influence

McCarthy[4] in a study of 48 children 2 to 7 years old found 14 of them to be a "feeding problem group." The older children expressed increased indifference toward food with the problem group showing the major tendency away from strong food likes and strong aversions with increase in age. Food aversions of the family were associated with 35 per cent of the aversions of children, but the aversions of siblings were more nearly alike.

Smith et al.[5, 6] in studies with 235 graduate students found that contacts made early in life greatly influence food acceptance and that familiarity with food seems to be the important factor in food selection.

Schuck[7] reported that college women

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were familiar with more foods and were willing to eat more fruits but not more of the vegetable or meat groups than college men. Results would indicate that familiarity with a food may increase its acceptance if the early association was a positive, pleasurable situation.

Lewin[8] interviewed homemakers to find that the mothers' concepts were the major influence on the food habits of the family. She established what was considered "food for us" and developed ideologies such as health, taste, status, and cost which family members acquired but could seldom define the values involved. With a questionnaire made up of indirect questions and administered to 2,300 school children, Lewin determined how children perceived food: as "conflict," "praise," or "scold" food according to the "authority" in the home.

Davids and Lawton[9] analyzed mother-child relationships and found that 11-year-old boys who had positive self-picture and positive mother-concept had fewer food aversions and liked a greater variety of foods than a comparable group of disturbed boys the same age. These data support the idea that self-concept, mother-concept and food aversions are interwoven in a child's unconscious processes. The way that oral gratification and feeding situations are handled in early childhood can have lasting effect on the intellectual and emotional development of the child.

Food Aversions and Neuroses

Numerous research reports indicate that food dislikes are associated with unknown, unfamiliar foods and that a fear of the unknown is associated with rejection. Wallen[10] suggests that food aversions should be based only on those foods which have been actually tasted and then rejected. Wallen, [10, 11, 12] whose research in the 1940s is basic to many current concepts about food aversions, has indicated the following reasons for development of food aversions:

a) emotional experiences at meals,
b) faulty and capricious training methods especially as related to basic physiological processes such as eating and toilet training,
c) fear of the new and strange,
d) unpleasant image association aroused by the food,
e) neuroses-disorder associated with any one or special combination of anxieties, compulsions, obsessions, phobias, and motor or sensory manifestations resulting in disorganization of personality.

Smith and Ross[13] tested Wallen's ideas that food aversions are related to inadequate emotional control by securing simultaneous information about anxiety, biographical data, and food aversions on 318 college and 107 high school students. No difference in food aversions and age level was found; in fact, the higher the anxiety score the greater number of food aversions were indicated. Further analysis of personality characteristics indicated that fear and anxiety predict food aversions, that subjects with a large number of food aversions have neurotic characteristics, and that these subjects will tend to report dislikes and not to eat foods which they have never tasted.

Hinton et al.[14] found in a study of 140 girls, 12 to 14 years old, that the only significant relationship found was that of scores on Minnesota Counseling Inventory Scale and eating behavior. The higher the scores on family relations, emotional stability, and adjustment to reality, the fewer meals missed and the better the nutritional quality of foods chosen.

Altus[15] added eight foods to Wallen's list of 20 foods in order to include foods known to "unlettered" men in the army. In every instance, more illiterate men disliked foods common to both lists than did Wallen's normal men. Altus believes that illiterate men are more apt to be neurotic than men whose average IQ is 30-35 points higher, but neurotic or not, illiterate men have more food aversions than normal ones.

Wallen[11] believes women are somewhat more prone to have food aversions than men which may be attributed to greater sensitivity of women to stimulus or stress while men are reluctant to admit any failure to measure up to the social image of "man." Social pressures may influence a man to do what is expected of a man, his duty to the social image. Men are considered to have stronger likes in food than women who have stronger dislikes according to Wallen's data[11] on 545 persons of whom 34 were 18-25 years old and the rest older. The aversions were similar.

Among 235 graduate students, Smith et al.,[5,6] found a marked sex difference in that more females than males reported aversions to foods they had never tasted. These data support Lewin's[8] theory "they like what they eat rather than eat what they like." Smith et al.[5] reported females had significantly higher anxiety scores on the Taylor scale and had more food aversions than the male students.

Food Preferences

Pilgrim[16] found that the American male likes his food plain and simple, rating milk the most acceptable food, next grilled steak, ice cream, French fried potatoes and hot biscuits. Only a few vegetables were well liked and even less accepted when sauces and dressings were added. The five most liked vegetables were tomatoes, potatoes, green peas, corn and green beans.

Vegetables as a group are the most disliked, irrespective whether the person had "known" the food previously or not, according to Breckenridge[17] in a study of 51 children averaging 8 years old. Hall and Hall[18] found the dislike for strong flavored vegetables to be exceeded only by the dislike for organ meats and shellfish in a survey of 693 university students (478 women and 215 men). Eggs are often listed as disliked especially as related to some method of preparation. Methods of preparation are often included as parameters of food aversion and food combinations draw much criticism and rejection.

Preferred foods vary with age and familial concepts and include beef steaks, milk, and ice cream with chocolate as a favorite flavor. Methods of cooking the steak showed further differences of acceptances at the regional and socioeconomic levels.

The world food supply would not be as dangerously deficient if people would accept highly nutritious sources of certain nutrient groups such as fish flour or various types of yeast supplements. The lag between plant breeding and production of food is greatly extended when considered in conjunction with the lag between food production and consumer acceptance, especially the consumer at the lower socioeconomic level.

Physiological Differences

Even though some aspects of accepted and rejected foods are very similar for persons of a given age, socioeconomic level or educational background of the mother, basic physiological differences occur which are considered to be individualisticly genetic. Nevertheless, Snyder[19] concurred with results from research that as many as 40 per cent of individuals do not possess taste sensitivity for certain bitter compounds. Snyder reported 31.5 per cent of 440 subject members of 100 families were unable to detect a bitter compound which the other 68.5 per cent responded to with great rejection. He found the response to be related neither to age, sex, nor race. He attributes the taste deficiency to a single recessive gene.

Pfaffmann[20] presents a thorough anal-

ysis of the sensory properties of taste as differentiated from flavor. Taste is a receptor sensitive to different ions and molecules with selectivity giving rise to an afferent neural code in the taste nerves to the brain resulting in the sensations of salty, sweet, sour, bitter, or some other quality. These sensations control ingestive behavior, either that of acceptance or rejection of the item.

Glanville and Kaplan[21] describe a highly involved research design involving 187 adults, which included 39 husband-wife pairs, 16 pairs monozygotic twins and 10 pairs of dizygotic twins. Repeated determinations of the taste threshold of an individual have shown that under controlled conditions thresholds are relatively stable. However, a number of factors affect these thresholds such as a decline in sensitivity with increasing age, heavy smoking is related to insensitivity, and physiological disturbances which increase sensitivity.

Analyses of taste are only a fragment of food acceptance. To illustrate, sweet is universally well accepted provided it occurs in the "right food," that is, not one which custom, culture, or family has designated to taste otherwise. However, cravings for certain tastes develop such as for sweets in prisoners of war whose supply of carbohydrate is sufficient in the form of starch but lacks sucrose. Pfaffmann[20] believes "The so-called 'sweet tooth' illustrates the fact that certain innately positive stimuli not only instigate ingestion of food but also could serve as rewards or reinforcement for learning." The specific hunger response for sodium chloride is also described by Pfaffmann, who expresses concern for the many unanswered questions as to the precise physiological mechanism by which such hunger is guided and regulated. These reports illustrate the complexity of food acceptance even from the aspects of precise chemical and physiological measurements.

Babcock[22] stresses the complexity of the task as centering on "communication of knowledge and aptitude appropriate to the healthy use of food." The responsibility of finding the means by which to have food acceptability coincide with nutrient needs of the person rests on the dietitian in the hospital, school cafeteria, military installation, or university food service and on the nutritionist in teaching and research.

Summary

In order to be effective in the profession, the nutritionist and dietitian must understand why people eat as they do and why food is accepted or rejected. This is a concept that has not been taught as effectively as those related to what should be eaten.

Primary in the parameters of food acceptance is the training of the young child in familiarity with a wide variety of food effective in maintenance of health. This should be initiated at birth, supported in the home, and propagated by effective educational experiences in several aspects of school life. Research reveals several effective techniques and procedures to use to achieve the best dietary practices in adolescents.

In dealing with adults, especially those in group-feeding situations, the dietitian and nutritionist must realize that food aversions are deep rooted and may require a team of experts a long time to help even one such person. The close association of food aversions with the total emotional and rational behavior of an individual has been established. As with all health problems, food aversions need to be recognized as one which was easier to prevent and control in the young than in the adult population. This is the challenge to nutrition education at all levels of learning, starting with the infant.

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EATING BEHAVIOR OF PRESCHOOL CHILDREN

J. Nutr. Ed., 1(1):16-19, Summer, 1969

Ercel S. Eppright, Hazel M. Fox, Beth A. Fryer,
Glenna H. Lamkin, and Virginia M. Vivian

Portions of a survey pertinent to nutrition education. Sample involved 2,000 households and 3,444 children.

Lifetime eating habits may be influenced by many factors in the early feeding of children. Knowledge of such influences is imperative to the development of sound nutritional education. The study reported here is a survey of 2,000 households and 3,444 children ranging in age from birth to six years.

This article is based on a 1965 cooperative study involving agricultural experiment stations of Illinois, Iowa, Kansas, Nebraska, and Ohio; and the Cooperative State Research Service, USDA. The report includes selective portions of the study primarily pertinent to nutrition education.

Conducted as part of the North Central Regional Project NC 75, "Factors Relating to the Diets of Preschool Children of the North Central Region," the detailed reports of nutrient intake, anthropometric measurements and socioeconomic data will appear elsewhere.

In the cooperative study, "Factors Relating to the Diets of Preschool Children of the North Central Region," analysis of the data relating to eating behavior of the children and concerns of the mothers suggests several practical implications in the development of nutritional education programs to benefit this population.

Most preschool children in the North Central Region come from families who can afford to give their children a proper diet. At least one family in 10, however, may be on a marginal economic level. Nutritional education is especially needed by mothers in urban areas and by those having less than a high school education, and should be directed to fathers and older siblings as well as to mothers.

Many mothers do not realize the desirability of including fruits and vegetables rich in vitamins A and C in the diet. By the age of three years, many children have developed a dislike for certain foods or types of foods, notably vegetables.

Attention should be given to the present and future effects of the preoccupation of many mothers that their children are eating too little. Mothers may overestimate the amounts of food needed by preschool children and encourage overeating at this early age.

In the same context, parents may need to become aware of the possible psychological effects of negative ways of dealing with children when they are reluctant to eat.

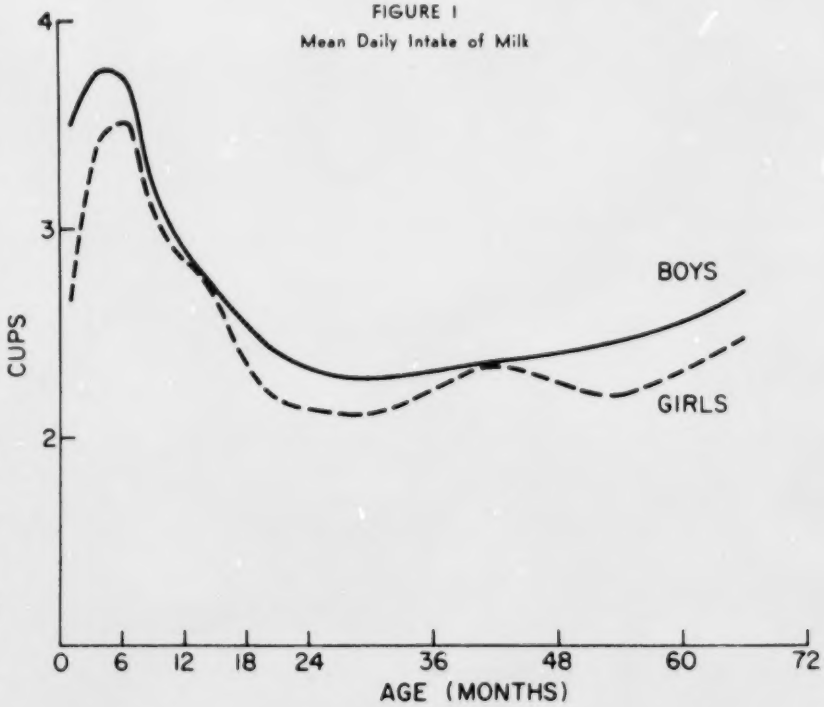
Knowledge of the developmental changes during the preschool period and their potential relationships to eating behavior may help to reduce the feeding problems arising in the toddler and early preschool years.

A sound nutritional education program for parents of preschool children should focus on the child's total development and the interaction of the physiological, psychological and sociological aspects that influence a child's eating behavior.

Study Purpose and Survey

The purpose of the study was to: evaluate the nutrient quality of the diets; ascertain feeding practices and other factors possibly related to diet quality; assess the children's physical status; acquire information on the children's

FIGURE 1
Mean Daily Intake of Milk



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health and health protection; and reveal information helpful in planning and conducting nutritional education programs.

The Iowa State University Statistical Laboratory prepared a selfweighting, stratified, multistage, cluster sample of households from 12 north central states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. Interviews were conducted by trained personnel, all supervised by researchers from the five cooperating experiment stations and the Statistical Laboratory.

The largest segment of preschool children is in cities of 50,000 and larger. The study showed a lower level of nutritional knowledge by the mothers in such cities than in the other zones of the sample.

Nutritional knowledge by the mothers varied directly with the educational level. Approximately 30 per cent of the mothers surveyed had less than a high school education, but about 70 per cent had at some time attended classes in nutrition. In general, the economic level of the families surveyed made a nutritious diet possible. Only nine per cent had annual incomes below $3,000 after taxes. Few fathers were unemployed. Only 11 per cent of the mothers were employed outside the home.

Food Types and Amounts

Mothers were asked to state the kinds of foods their children should have and the frequency and amounts needed. Ninety-eight per cent mentioned the daily use of milk; the mean of the amounts mentioned was 3.3 cups daily. The actual average daily intake of milk as such is shown in Figure 1. Only children less than one year of age averaged a consumption of three or more cups daily. Thereafter, mean daily intakes approximated two and one-half cups. As noted by Beal[1] the peak of consumption was around six months of age, and boys usually averaged greater milk intakes than did girls.

Although almost 90 per cent of the mothers thought that their child should have one serving of vegetables daily, only seven per cent of them designated vegetables from the dark green, leafy, and yellow group. Similarly, two-thirds suggested that the child should have fruits daily, but only nine per cent designated fruits in the vitamin C-related group. Almost 90 per cent thought the child should have bread with an average of two slices daily. Eighty-four per cent thought the child needed about one tablespoon of fat (as such) daily; and 79 per cent stated the child should average one serving daily of such foods as desserts and cookies. If the children in this study consumed the foods specified by mothers as important in the daily diet, the nutritive quality might be reasonably good, with the possible exception of vitamins A and C. The amounts of food listed and the variety suggest an early emphasis on a high level of food consumption.

Mothers of children of three years or younger were asked if the children liked foods of the vegetable and fruit groups or if they refused or had to be coaxed to eat some of them. Eighteen per cent of the children who had been given vegetables but only three per cent of the children who had been given fruits were reported to dislike or refuse these foods. The vegetables most frequently disliked, in order mentioned, were spinach, carrots, green beans, and peas. In the 9- to 12-months group, the percentage of children described as having dislikes for vegetables was 9.5; at 1 to 1½ years, 16;

TABLE 1

Attitude of Family Members to Vegetables Disliked by Child

	Likes	Dislikes: Will not eat	Will eat	N
	%	%	%	
Father	76.4	17.1	6.5	170
Mother	82.5	12.2	5.3	183
Older Brother	49.3	44.3	6.4	79
Older Sister	60.9	34.5	4.6	87

TABLE 2

Eating Behavior of Preschool Children—Concerns of Mothers

Age Group	0 to 3 mo.	3 to 6 mo.	6 to 9 mo.	9 mo. 1 yr.	1 - 1½ yr.	1½ - 2 yr.	2 - 3 yr.	3 - 4 yr.	4 - 5 yr.	5 6 yr.	T
	%	%	%	%	%	%	%	%	%	%	%
1. Chooses limited variety	2.6	8.7	12.0	24.6	34.1	37.6	40.3	41.2	44.8	34.2	35.8
2. Dawdles with food	10.3	3.1	15.5	14.6	34.1	25.7	36.8	43.8	39.7	33.3	33.5
3. Eats too little fruits & veg.	0.0	2.4	12.9	14.5	15.8	29.4	27.2	27.5	27.9	27.1	23.9
4. Eats too many sweets	0.0	0.0	0.0	1.4	4.7	7.8	26.3	28.9	27.9	26.4	20.7
5. Eats too little meat	0.9	4.7	7.2	22.5	22.6	30.3	22.3	21.6	24.0	17.7	20.5
6. Eats too little food	8.5	2.4	8.2	10.1	14.7	13.8	21.6	28.3	21.1	22.8	19.9
7. Drinks too little milk	0.0	3.9	4.8	10.9	10.8	16.5	20.1	18.6	18.7	18.5	16.3
8. Drinks too much milk	9.4	7.9	7.1	5.1	10.0	13.8	10.0	7.1	7.1	5.9	8.0
9. Eats too much food	7.7	4.7	8.2	8.7	5.1	3.7	2.7	3.1	5.4	6.4	4.9
10. Eats too much meat	0.0	0.0	0.0	0.0	1.4	5.0	3.5	4.4	4.3	5.9	3.7
N	117	127	84	138	279	218	551	610	691	628	3444

at 1½ to 2 years, 24; and at 2 to 3 years, 21.

Attitudes of family members toward the vegetable listed as most disliked by the child are shown in table 1. Vegetable dislikes of these young children were more closely associated with those of older siblings than with those of father or of the mother. The tendency was for the dislikes of the children to be associated more with the dislikes of the fathers than of the mothers and with those of an older brother than of an older sister.

Eating Behaviour Concerns

Table 2 shows maternal concern about eating behavior or preschool children at various ages. Of a list submitted for checking, the choice of a limited variety of foods was the major concern for the greatest percentage of children. Next came dawdling with food, a concern for one-third of the children. In preschool years, frequency of the mother's concern about a child's eating too little food far exceeded that of eating too much. The concern about eating too little tended to peak at 3 to 4 years of age, coinciding with the highest frequency of concern about dawdling.

"Sweets" were the only type of food listed that generated concern among many mothers on the basis of overeating. This concern came sharply into focus in the 2 to 3-year-old group. Sweet foods, including candy, were the principal foods that the mothers tried to limit in their children's diets. Reasons given were not nutritious, eats too much, and produces a weight problem.

Reluctance to eat at mealtimee was checked as a problem for more than 75 per cent of the children in the study. This problem increased up to the 3 to 4-year-old group and then declined. Maternal approaches to the solution of this problem included: ignore, 46 per cent; punish or deny, 18 per cent; force or demand, 16 per cent; reason or coax, 15 per cent; substitute a liked food, four per cent; and threaten or bribe, one per cent. To get children to eat, many mothers seem to resort to such negative approaches as punishment, force, or threat.

Foods for Nonnutritious Purposes

Twenty-three per cent of the mothers surveyed used foods as rewards for good behavior; 10 per cent used deprivation of food as punishment; and 29 per cent used foods as a pacifier. Reward foods in order of frequency were: baked goods and desserts, 75 per cent; sweets such as suckers and other candy, 39 per cent; and fruits, 32 per cent. Similarly, foods deprived as punishment were: baked goods and desserts, 77 per cent; sweets, 51 per cent; and fruits, five per cent. Grain products, such as crackers, rusks, and bread and butter, were most frequently used as pacifiers. Sweet foods, including desserts, seem to be a group subject to early emotional connotations. In addition, one mother in four expressed concern about excessive use of sweet foods by the 3 to 4 year olds.

Children's Food Selections

Preschool children make food-selection decisions more often at breakfast and snack periods than at other times. The mother is most frequently involved in making food-selection decisions for the child. The father is similarly involved with only about one per cent of the children. His involvement is most frequent at the evening meal: one per cent on which foods eaten and four per cent on how much.

Table 3 shows the ages at which children were reported by the mothers to make decisions on what they eat. More children were allowed freedom in deciding upon the amount of food eaten than in deciding upon which foods are eaten. About half the mothers said that they decided the amounts of foods the children ate at meals. The study suggests that about half the children enter school with little experience in making decisions about food selection.

Meal-planning Influences

Mothers were asked to check a list of items that influenced their meal planning and to add other items if they wished. The largest percentage checked the nutritive value of food. This response, however, may be a bias injected by their knowledge of the purpose of the study. The frequency in which the items were checked as a strong influence was: husband's likes, 81 per cent; likes of other members of the family, 72 per cent; food cost, 68 per cent; child's likes, 58 per cent; preparation time, 48 per cent; and family health problems, 33 per cent. Emphasis on the husband's likes and dislikes as they affect family eating patterns has been observed by other researchers and reemphasizes the husband-father need for nutrition education.[2,3]

Considerations other than those listed on the check sheet were given by 260 respondents. Of these less than 10 per cent mentioned season of the year, variety and use of new foods, food color and appearance, and family schedule.

Need for Better Understanding

The study indicates the need for a much better understanding than we now have of the eating behavior of preschool children. In the longitudinal investigations of the Child Research Council, Colorado School of Medicine, Beal[1] observed a smooth curve in nutrient intake both during the first months of life and between 4 and 8 years of age, but there were intake irregularities between late infancy and the early preschool years.

Erratic food intakes have been associated with changes in growth rate. In this study, a marked directional change in mean heights and weights took place at about eight months. The decided tendency of many children to dawdle with food was observed by mothers to occur at 1 to 1½ years. Goldbloom[4] has pointed out that, with the onset of locomotion and partly as a result of increased physical activity, the child loses body fat, or reaches a "thinning out stage," and that parents often become concerned that the child is not eating enough at this stage of development. Goldbloom states

TABLE 3

Age at Which Children Make Decisions about Which Foods Are Eaten

	1 1½ yr.	1½ 2 yr.	2 3 yr.	3 4 yr.	4 5 yr.	5 6 yr.
	%	%	%	%	%	%
Breakfast	4.7	6.0	16.9	28.0	27.1	33.0
Noon meal	3.9	2.3	7.1	8.4	12.7	12.6
Evening meal	3.2	0	3.6	2.5	3.3	1.8
Snacks	5.7	10.6	22.3	25.5	27.2	36.5
N	279	218	551	610	691	628

further that this "thinning out stage" often coincides with the so-called period of "physiological anorexia" observed by pediatricians to occur between 18 and 24 months of age. Another factor involved in eating behavior at this stage may be the growing autonomy of the child with his struggle for independence and his involvement in the socialization process. The age of two years is sometimes referred to as the "no-no" period.

Problems may arise from a lack of understanding of the physiological and psychological changes undergone by children as they pass through the toddler stage into the early preschool years. Further analysis of the data collected in the study reported here may indicate whether the eating behavior responsible for maternal concerns is reflected in the actual composition of the diet and body size.

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FOOD ACCEPTANCE AND NUTRIENT INTAKE OF PRESCHOOL CHILDREN

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Inez Harrill, Carmen Smith, and Joan Anderson Gangever

Preschool personnel have a responsibility to help children achieve and maintain nutritional well-being. Nutrition education in the preschool program is an effective means of establishing positive attitudes toward food.

The initial purpose of this investigation was to determine the nutritive value of foods consumed at the noon meal and morning snack by a selected group of preschool children, 3 to 5 years of age. An analysis of the food intake showed that individual food preferences influenced the balance of nutrients consumed by some children. A second study was conducted to explore the effect of relevant food-acceptance training on intake of selected foods by preschool-age children.

Permission was obtained from the Director of Colorado State University Preschool to record the food intake of children who attended the school. Except for three children who were ill, each child enrolled in the preschool participated in the study. Mean age of the 17 children observed (10 girls and seven boys) was three years and 11 months. The children studied were from middle- and upper-class families.

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Recording Food Intakes

Gram weights of the foods consumed by each child were recorded over a four-day period. A spring-type dietetic scale was used to weigh the foods; the weights were recorded on record sheets previously prepared and marked for each child.

The noon meal consisted of a protein-rich food, cooked green or yellow vegetable, another raw vegetable or fruit, milk, bread, and dessert. All foods were prepared as usual by the cook employed by the university preschool. The weights of all foods served were read and recorded by one of the authors. Approximately 30 minutes before serving, desserts and milk were weighed in marked containers and refrigerated. The other foods were weighed as served, and all foods were then transferred to the tables in the place of each designated child. Second servings requested by the children were weighed. Weights of foods remaining on the plate were subtracted from the weight of the food served. A mid-morning snack—one-half cup of orange-grapefruit juice—was served during each day of the study.

Standard tables of food composition (1, 2) were used to analyze the food records for calories and eight nutrients. The calculated nutritive value of the weight of mixed dishes consumed was derived from the weights of the ingredients used and the total weight of the final product.

A follow-up study was designed to determine the effect of providing food information on the intake of selected foods by preschool children. Eight girls and 11 boys participated in the follow-up study. Mean ages of the children classified, according to consecutive years, were: three years, nine months (four subjects); four years, four months (14 subjects); and five years, nine months (one subject). An initial weight of the test foods consumed by each child was compared with the amount of the same food consumed by the respective children immediateiy after participation in a food education program.

Four vegetables (beets, squash, Brussels sprouts, and cauliflower) which were included in the regular menus were selected for study. During a preliminary four-day period, the gram weight of each vegetable consumed by each child was recorded. Two weeks later, each of the four vegetables was again included in the regular menu planned for each day of a four-day interval.

The vegetable which was to be served

TABLE 1

Mean Values for Proportion of Recommended Dietary Allowances Provided by Food Offered and Number of Children Who Received Specified Proportions of Recommended Allowances from All Food Served at Preschool

Nutrient	Proportion of Allowance Offered		Proportion of Allowance Consumed					
			Less than 25%		25 - 33%		33% or more	
	Noon meal	Noon meal + snack	Noon meal	Noon meal + snack	Noon meal	Noon meal + snack	Noon meal	Noon meal + snack
	%	%						
Kilocalories	31	35	7	3	8	10	2	4
Protein	57	59	0	0	0	0	17	17
Calcium	39	41	0	0	4	3	13	14
Iron	20	25	15	14	2	2	0	1
Vitamin A	70	76	0	0	0	0	17	17
Thiamin	27	35	13	0	2	13	2	4
Riboflavin	59	61	0	0	0	0	17	17
Niacin	38	40	0	0	0	0	17	17
Ascorbic acid	18	132	17	0	0	0	0	17

[1]Seventeen subjects.
[2]Includes dietary sources of preformed niacin and the precursor, tryptophan.

during the noon meal of each day of the four-day period was used to plan the education program presented to the children during the 30-minute period prior to the meal.

The food education program, consisting of discussion periods and dramatic exercises or games, was conducted by one of the investigators. Felt boards, raw vegetables, hand puppets, and hero pictures were used to explain and discuss the name, color, growth, texture, odor, shape, preparation, and food value of each vegetable. The exercises or games were planned by the children, with guidance from the investigator.

The investigator observed the children in preschool prior to the study to increase the children's confidence in her. The lessons were planned to promote active participation in the study by children in the preschool where environmental conditions were familiar and comfortable. All children were given an opportunity to touch and smell the vegetable. To provide immediate reinforcement, the vegetable was served as part of the noon meal which followed the instruction period, and the post-education measurement took place immediately following the education program for each vegetable included in the study.

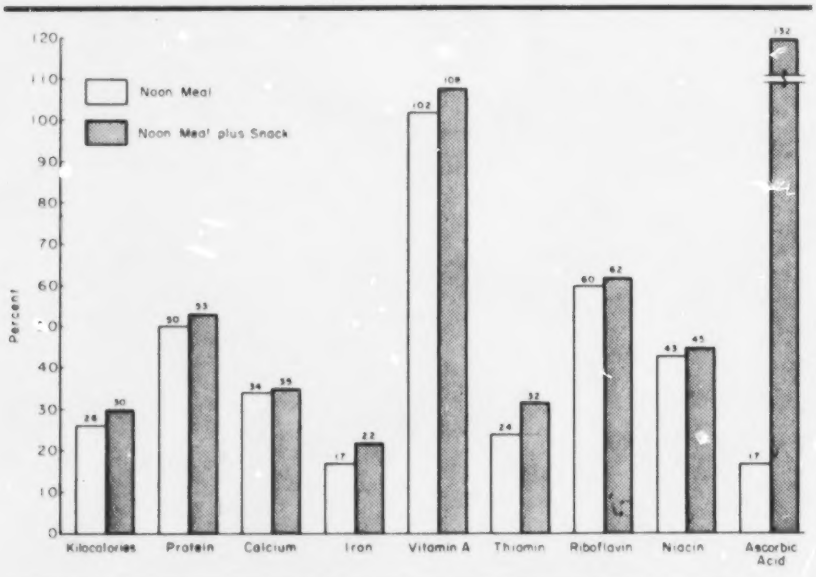

Fig. 1—Percentage of Recommended Dietary Allowances supplied by mean daily intake of calories and nutrients from food eaten by children at preschool.

Vegetable Consumption

Mean values for the calculated proportion of Recommended Dietary Allowances (RDA) (3) provided by the food offered in the first study to the children are given in Table 1. The children were encouraged to taste all foods and ask for second servings. The average amount of foods offered to the children during the four-day period provided one-third or more of the recommended allowances for calories and all key nutrients except iron.

The calculated mean daily intakes of calories and eight nutrients from food eaten at preschool by children 3 to 5 years of age are compared with RDA for four-year-old children in Figure 1. The mean caloric intake was less than one-third of the RDA. Mean daily intakes of all key nutrients except iron and thiamin exceeded one-third the RDA. The average iron intake was less than 25% of the amount recommended for childen age 3 to 5.

Consideration of individual intakes from foods served showed that some children received less than one-third the recommended amounts of calories and key nutrients (see Table 1). Thiamin and iron were the nutrients consumed in the smallest relative amounts. The morning snack provided 87% of the mean ascorbic acid intake and 10% of the mean caloric intake.

Caloric intakes at the noon meal by children in this study were similar to those reported by Samenfink et al. (4) for children of the same age group. The intakes of vitamin A and thiamin by children of this study were lower than those observed by Samenfink et al., whereas the amounts of other nutrients were similar. Those authors stressed the importance of adequate intake of calories and nutrients at midday by children of preschool age.

Foods consumed by the children were evaluated in terms of the respective contributions made by each of the four food groups to mean caloric and nutrient intakes (see Fig. 2). Milk supplied a higher percentage of calories, protein, calcium, and riboflavin than any other food group. The proportion of the caloric and nutrient intake provided by the

various food groups reflected, in part, the preferences of the children for certain foods. Bread was one of the better sources of iron, thiamin, and niacin. Sandwiches and toast were liked by the children. Liver loaf, which was better accepted by the eldest children, increased the mean iron and vitamin A contribution of the meat group.

Except for vitamin A, fruits provided larger amounts of minerals and vitamins than vegetables did. Green vegetables, which are good sources of iron, other minerals, and vitamins, were not liked by most children. The children were encouraged to taste all foods served, but the mean consumption of spinach on the day it was served was two grams. Other vegetables were eaten sparingly. Twenty percent of the gram weight of green beans served was returned. Beets, celery, lettuce, and vegetable soup were not well accepted by most of the children.

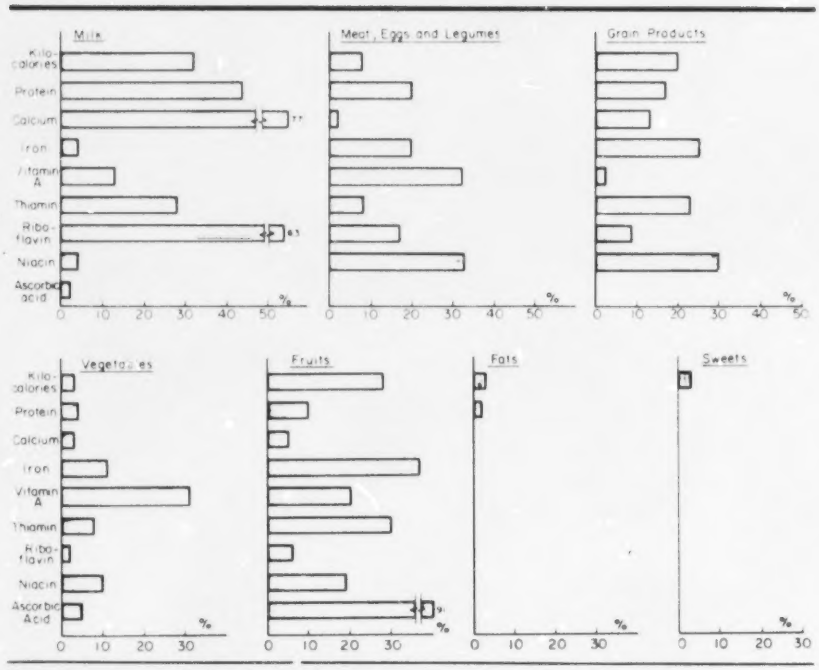

Fig. 2—Percentage contribution of various food groups to the nutrient intake of children at preschool.

Educational Program

The results of the study of caloric and nutrient intake of preschool children prompted an investigation of the effect of an educational program on the intake of specific foods which were not popular food items with preschool children. Table 2 shows the mean amounts of the test vegetables consumed before and immediately after the discussion periods. The amounts of the vegetables consumed after the respective lessons were greater than the initial intakes. The increases in the mean intakes of the vegetables were: cauliflower, 10%; squash, 16%; Brussels sprouts, 66%; and beets, 80%. The number of children who ate a portion of each vegetable served after the lesson was greater than the number who consumed the respective vegetable preceding the lesson.

Comparison of the mean intake of vegetables by girls with that of boys showed that girls consumed more than boys. After the lesson, the average consumption of beets, Brussels sprouts, cauliflower, and squash by girls was, 11, 15, 12, and 8 grams, respectively. Corresponding values for boys were, respectively, 5, 6, 6, and 6 grams. The response to the food education program, measured by increase in consumption of vegetables, was greater for three-year-old children than for the older groups. However, the older children were more interested than younger children in the discussion of particular vegetables and the dramatic exercises.

Other workers (5, 6) have reported that preschool-age children dislike many vegetables. Mirone et al. (6) emphasized the need to stress "the role of vegetables in good nutrition and early formation of good food habits through educational programs for parents." Parents of children who participated in this study were interested in the results—which were presented to all interested individuals at a group meeting. Results of this study suggest:

Group education efforts which provide information about foods promote acceptance of the foods by preschool children on a short-term basis and help provide a foundation for nutrition education during elementary years;

Increased attention should be directed to food information programs for preschool children; and

Additional research is needed to evaluate the effects of these programs over a period of time.

Summary

The nutritive value of foods consumed at the noon meal and morning snack by preschool children 3 to 5 years of age was calculated from

TABLE 2

Vegetables and Amounts Consumed by Nineteen Children Before and Immediately After A Food Information Program

Vegetable	Before Lesson				After Lesson			
	Amount Served	Amount Consumed		Children who ate none	Amount Served	Amount Consumed		Children who ate none
		Mean	Range			Mean	Range	
	gm.	gm.	gm.	no.	gm.	gm.	gm.	no.
Beets	15	5	0-16	7	14	9	0-22	2
Brussels sprouts	16	6	0-18	6	15	10	0-20	3
Cauliflower	15	9	0-28	4	13	10	6-22	0
Squash	11	6	0-12	5	13	7	0-22	3

12

weighed diets. Mean dietary intakes except for calories, iron, and thiamin equaled or exceeded one-third of the RDA. The proportion of the caloric and nutrient intake provided by the various food groups reflected the preferences of the children for certain foods. Vegetables were eaten sparingly. A food information program increased the mean intake of four test vegetables.

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The Dietary Status of Preschool Children: An Ecological Approach

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Mary Alice Caliendo and Diva Sanjur

The relationship of several variables to dietary quality is explored

Summary

One hundred thirteen preschool children and their families from Well Baby Clinics were sampled to investigate factors affecting the dietary status of the children. Variables assessing resource availability, demography, psychosocial characteristics of the mothers, and preschooler characteristics were related to the quality and diversity of the children's diets. Relationships between variables were analyzed by means of correlations, regressions, and path analysis. Variables exerting predictive influence of the dietary quality were those of sex, ordinal position, mother's employment status, education, and her nutrition education.

An Environmental Perspective

Dietary intake is recognized as being only one of many environmental factors which interact with the genetic potential of the young child to affect physical and mental development. The development of the child's nutritional status never occurs in isolation; rather, there exists a whole constellation of environmental factors which act together.

Many nutritionists have recently emphasized the need for research relating dietary patterns to sociological, behavioral, and environmental factors. Studies focusing on the biological and physical aspects of food consumption indicate that a significant percentage of the U.S. population has inadequate intakes of one or more nutrients (1-3).

Yet much more needs to be done to relate the forces affecting food patterns. In general, nutrition studies have centered on only a few of the factors which may affect the dietary status of the population involved. If we are to consider all relevant aspects of a nutrition problem, it is imperative that the availability of food, as well as factors due to sociocultural, psychological, or economic variables be studied. Thus, this study attempted to explore and identify some of the factors related to food behavior of the preschool child (4, 5).

It is important to analyze the food habits of persons to identify salient characteristics of their food patterns and to determine the extent, location, and reasons behind any inadequacies in their diet. One approach to such analysis is the investigation of positive elements existing in the population's present food habits. After the positive elements are identified, it is possible to work within that framework to produce meaningful changes (6).

Theoretical Model

Facts must be organized into a meaningful and useful pattern so that they can be appropriately applied to circumstances that are peripheral to the specific setting in which particular research investigations have been conducted. It is useful to illustrate factors related to a child's dietary status by means of a conceptual model. The model proposed for this study is illustrated in Figure 1. This model is based on one developed by Sims (7) but has been modified in order to include influences of the child on the environment. The Sims model emphasizes only the effects of variables on the child.

In the U.S., a variety of different foods is available to most consumers. The influence the child exerts on dietary decisions is well recognized and exploited by food advertising in the media. Thus, the influence and interaction of the preschooler with those who provide food must not be overlooked. It has recently been contended that the pursuit of questions which focus on the impact of the child, both directly and indirectly, is essential for the further advancement of knowledge and theory on the process of human development. However, the common research situation involves the preschooler as the subject being acted upon, rather than as an individual capable of exerting an independent influence on his/her environment (8). This implies that the process taking place is usually viewed as *unidirectional.* This feature, so common in research, is not characteristic of the situation in which the preschool child usually functions. The child invariably influences those who influence her/him. Thus, it is essential to include characteristics of the child such as food preferences and responsitivity to the eating situation, in assessing dietary and/or nutritional status.

Demographic and family resource variables included: household number, ethnicity, education levels of parents, occupation of parents, family income, housing characteristics, and family food expenditure per month. Maternal variables included: nutrition education, communication channels, meal planning, and maternal attitudes assessed by the Parental Attitude Research Instrument (PARI) (9). Preschooler variables included: age, sex, ordinal position, food preferences, and food attitudes.

The family directly influences dietary practices as it provides the child with food and nutrients and indirectly influences dietary practices by transmission of attitudes, preferences, and other environmental factors which affect the child's lifetime eating patterns. Thus, demographic characteristics of the family's availability and use of resources as well as the social-psychological attributes of the mother are conceptualized as independent variables which will in turn affect the nutrient intake of the child.

The variables included in this study are those termed, according to econometric convention, the "economic" variables, such as education, occupation, income, and housing characteristics, as well as "non-economic" variables, such as ethnicity and family composition (10).

The non-economic characteristics of the mother include the variables of her attitudes towards the preschooler and her/his

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Diets were also evaluated in terms of the concept of food diversity... a function of the total number of foods consumed by the child during a one-day period.

eating habits, to the homemaker role, to the tasks of meal planning and preparation, as well as the mother's communication channels. The model postulates that these variables will be correlated with the economic variables as well as with characteristics of the individual preschooler and will produce the dietary status of the child; the dietary status is the final dependent variable.

Dietary status was determined from a weighted dietary quality score. The dietary quality score is based on the extent to which a child's diet in one 24-hour recall period satisfies the Four Food Group pattern. The method of derivation can be seen in Table 1.

Diets were also evaluated in terms of the concept of food diversity, which is defined for the purposes of the study as a function of the total number of foods consumed by the child during a one-day period. Based on the notion that the key to a nutritionally adequate diet is a variety of different foods, the diversity score was developed to measure the food variety of the population.

To determine the diversity score, the following procedures were used. All of the foods recorded from the recalls were first tallied to see exactly what foods were actually consumed by each child. This list was then analyzed to see how many different food items were included. A total of 134 different items were recorded. For each item, the frequency of its mention on different individual recalls was recorded and the totals for each item were tallied. This list was condensed into a 20-item list by including each item which was consumed by 20% or more of the children under investigation. A 20-item list described the diets of this preschool population: 1) milk, 2) other dairy products, 3) meat, fish, poultry, 4) peanut butter, 5) eggs, 6) potato, 7) spaghetti, rice, macaroni, noodles, 8) dark green/yellow vegetables, 9) other vegetables, 10) citrus fruits or juices, 11) fruit drinks, 12) other fruits, 13) breads, cereals, crackers, 14) fats, 15) Koolaid, 16) snack foods—potato chips, pretzels, etc., 17) sweet desserts, 18) concentrated sugars—jam, candy, etc., 19 sandwich, 20) soup. The diets for each child were scored with one point for each of the 20-item foods mentioned. There is no indication of individual food item quantity or nutritive value of the diet using this dietary diversity scoring method. All this is implied by the diversity score is the intent of variety in the child's diet. When combination dishes were mentioned, for example, a sandwich or a casserole, these items were scored as only one item instead of individually scored for the various foods making up the product.

Table 1 Dietary quality scores (n = 113)

Dietary Quality Level	*Weighted Score*	*Number of Children Receiving Score*	*Percent of Children Receiving Score*
Four Food Groups:			
including citrus and dark green or deep yellow vegetable	6	20	18
but no dark green or deep yellow vegetable	5	21	18
but no citrus fruit	4	17	15
only two servings from each Group	3	26	23
only one serving from each Group	2	26	23
less than one serving from any Group	1	3	3

"Chunk" Sampling

The sampling procedures used in the study may be described as "chunk" sampling in that typical or representative units of preschool children were chosen on an a priori basis for inclusion in the final sample. To assure that the population would represent a variety of family backgrounds in terms of ethnicity, income, size, composition, parental occupation, and education, the only restrictions placed on the 113 children included in the sample were:

- That the children be participants in the Tompkins County Well-Baby Clinics during 1973
- That the children be between age one and four years
- That the children be free from known disease.

The children's mothers were surveyed by interviews conducted by the senior author. A questionnaire consisting of 60 open-ended and closed questions was the instrument used to collect data on the variables studies. Descriptive characteristics of the sample population are indicated in Table 2. Dietary data

Table 2 Selected family descriptive characteristics of the sample preschool population (n = 113)

Variable		*Percent of Sample*
Age		
1		37
2		29
3		28
4		6
Sex		
Male		53
Female		47
Race		
Caucasian		90
Black		6
Oriental or East Indian		4
Birth Order		
First		53
Second		22
Third		9
Fourth (or more)		16
Parents' education		
Fathers who completed	high school	28
	college	29
Mothers who completed	high school	37
	college	24
Mother's employment status		
Employed outside home		32
Actively looking for work		7
Family income		
>$10,000 yearly		27
$5,000–9,999 yearly		44
$1,000–4,999 yearly		26
<$1,000 yearly		2
Occupational Status of Father		
Labor-factory		26
Service-oriented		4
Skilled labor		20
Clerical, sales		10
Professional		26
Not applicable to family (no father present)		14
Type of nutrition class attended by mother		
Attended no class		54
Informal class, such as in childbirth classes		6
High school classes		27
Adult education/college		14

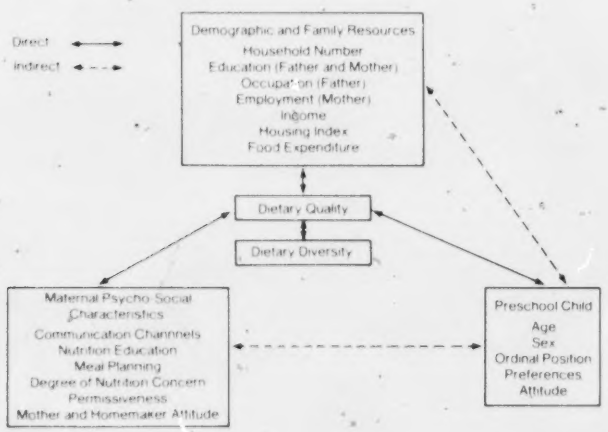
for the children were obtained by use of the 24-hour recall from the mother.

Variables Analyzed

The Pearson product moment correlation coefficient was used to evaluate relationships between variables. Multiple regression and then step-wise regressions were performed to choose independent variables which would provide the best possible prediction of relationships between dietary status and other variables (11, 12). The technique of path analysis was then used to explore the relationship between the dependent variable of dietary quality and selected independent variables which had been significantly related to it. Path analysis is a statistical procedure used to make explicit the rationale underlying conventional regression techniques; it focuses on the problem of the interpretation of variables (11). The purpose in using path analysis is to discover whether a proposed set of interpretations is consistent throughout (12).

The essential idea of the causal model involves the construction of an oversimplified model of reality (see Figure 1) in the sense that the model considers only a limited number of variables and relations out of the universe of social reality.

Figure 1 Factors related to a child's dietary status



Diversified Diets

Individual dietary diversity scores ranged from 4 to 13 from a possible 20. The mean diversity score was 8.5 with a standard deviation of 1.9.

As can be seen from Table 1, only 18% of the entire sample consumed diets which complied with the quality level of the Four Food Groups. The most limiting factor here was a dark green or deep yellow vegetable food; the second most limiting factor was a citrus fruit. Other findings show that 21% of the sample had no fruit during the period under study, and of those who did eat fruit, less than half ate a citrus fruit. Dark green leafy or yellow vegetables and fruits were consumed by only 20% of the children. Thirteen percent of the children ate no vegetables for the 24-hour recall period.

Environmental Relationships

Table 3 illustrates the correlations between those demographic and resource variables and psychosocial characteristics of the mothers which were most strongly associated with the dietary variables, and the dietary diversity and quality of the preschool child. Many of these correlations were statistically significant, some at the 0.001 level. All demographic and family resource variables listed in the table, except the number in the household and mother's employment status, were correlated with the dietary quality variable. That is, there was a positive correlation between resource variables and dietary quality.

Nutrition education was the variable most significantly correlated with the dietary variables. Variables of maternal and homemaker attitudes were also associated with the child's dietary quality score. In general, the more discontent, nervous, and unhappy the mother was with her role as a mother and a homemaker, the lower the scores were for her child's dietary quality.

Path Analysis and Path Model

Path analysis provided a way of taking into consideration the correlations between the independent and the environmental variables with the child's dietary quality. Multiple regression was used to determine which variables, when others were controlled for, might be predictors of dietary quality. From the variables, seven were selected as being important determinants of the child's dietary quality (see Table 4). To test the path

Table 3 Demographic, resource, psychosocial variables correlated with dietary status**

Variables	*Pearson Product Moment Correlations*	
	Dietary Diversity	*Dietary Quality*
Increased household number	-0.052	-0.257†
Mother's education, higher level	0.044	0.376††
Father's education, higher level	0.033	0.186*
Mother employed	0.071	-0.011
Father's occupation[1]	0.039	0.210*
Higher income level	0.138	0.238†
Nutrition education, higher level	0.277†	0.392††
Greater importance of meal planning	0.139	0.185*
Mother feels household tasks monotonous	-0.165*	-0.307††
Mother feels difficulty in meal preparation	-0.125	-0.208*
Mother experiences irritability	-0.271†	-0.244†

[1]Ranked vertically from labor to professional (see Table 2)
*significant at 0.05 level
†significant at 0.01 level
††significant at 0.001 level
**Positive numbers indicate a positive correlation between variables. Negative numbers indicate a negative correlation between variables.

Table 4. Variables regressed on dietary quality.

Variables	*Beta Values*	*Path Analysis Notation*
Sex of child[1]	-0.12797	X_1
Higher ordinal position of child	-0.32075	X_2
Mother's education, higher level	0.17819	X_3
Nutrition education, higher level	0.18086	X_4
Mother employed	-0.13091	X_5
Positive homemaker attitudes	0.16882	X_6
Greater dietary diversity	0.38103	X_7
Greater nutrition concerns of mother	0.10480	
Increased household number[3]	0.19728	
Higher income level	0.09651	
Father's occupation[2]	0.10996	
Child's positive attitude toward eating	-0.00905	
Father's education, higher level	-0.01179	

[1]Girl scored as one; boy scored as zero
[2]Ranked vertically from labor to professional (see Table 2)
[3]Because of the relationship between ordinal position and household number, only the former was incorporated into the final path model (Figure 2)

... nutrition classes for mothers acted to improve the dietary status of their preschool children by having an effect on the mother's attitude.

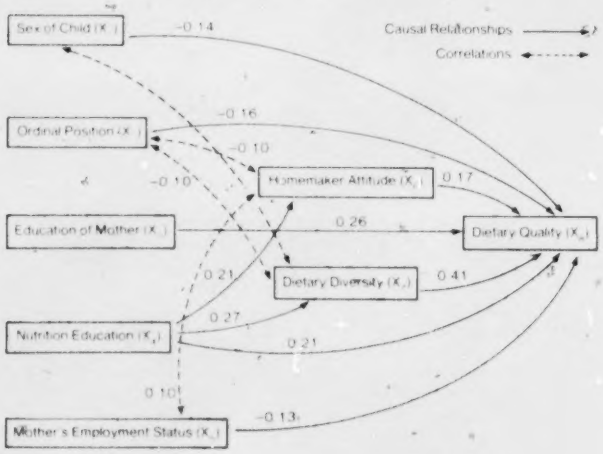
model (Figure 2), three multiple regressions were run; there were two variables that were intermittent, dependent variables, i.e., the homemaker attitudes and the dietary diversity score. It was hypothesized that both of these variables would be dependent on the mother's nutrition education. All beta values for the variables were statistically significant as confirmed by the F test.

The value, "R Square," adjusted for degrees of freedom, is a measure of the total amount of variance in the dependent variable which is explained by the independent variables in the equation. In this case, the value obtained was 0.50069, which means that slightly greater than 50% of the variance in the child's dietary quality score was explained by the present model—a high percentage for the sociological nature of the variables under study.

The direct effect of the independent, exogenous variables on the dietary quality score of the child is indicated by the beta values indicated on Figure 2. As these values suggest, nutrition education appears to act indirectly through the homemaker attitude as well as through the dietary diversity score. In other words, the model postulates a causal relationship between nutrition classes and an improved homemaker attitude and between nutrition classes and the food diversity score. The indirect effect of nutrition education through the homemaker attitude is reflected in a coefficient of 0.4 (.21 × .17). The indirect effect of nutrition education through the diversity score on the dietary quality score is .11 (.28 × .41). The effect of nutrition education is probably more subtle than these two variables indicate. In this study nutrition classes for mothers acted to improve the dietary status of their preschool children by having an effect on the mother's attitude.

Path analysis indicated that the sex of the child has an extremely important predictive role relative to the dietary quality score. Also, the child's birth order was negatively correlated with dietary quality. However, it is extremely difficult to evaluate the effects of ordinal position in young children, given its high correlation with family size. It is unlikely to find a four-year-old first born who has a large number of siblings, and it is redundant to point at the larger family of fifth borns. It is possible, though, in lower income groups, that birth order in itself might have adverse effects on the nutritional status of the young child. There might be patterns of food distribution in the home which shortchange the young. Also, since the child may have limited behavioral alternatives available, she/he is handicapped in calling and receiving the attention of the mother.

Figure 2 Path Model. Correlations between independent and environmental variables expressed as beta values



The Application Gap

There is a growing realization that our ability to communicate nutrition concepts and advice has not kept pace with scientific knowledge; there exists a kind of "application gap." We need to know much more about how to optimize existing food habits. As Foster admonishes, socio-technological development should be substituted for technological development to effect improved dietary practices (13).

It is probably the processes of education that determine behavioral change. It appears that psychosocial factors, i.e., maternal attitudes concerning meal planning and preparation, may be significantly more important than resource factors such as income in determining the diets offered to the child. Nutrition classes, whether they be part of formal education curricula or in hobby or homemaking programs, were beneficial for improving the child's dietary quality. These classes were beneficial in ways other than through just a dissemination of knowledge; appeals to logic in these classes should not be the only strategy for effecting change.

Food habits can be intelligently redirected as needed. It is important that nutrition educators research ways to uncover the circumstances that can facilitate this redirection. □

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Use of Food and Nutrition Knowledge by Mothers of Preschool Children

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Doris E. Phillips, Mary Ann Bass and Elizabeth Yetley

Family characteristics associated with the use of presweetened cereals are determined

Summary

Thirty upper-middle class mothers and their preschool children were interviewed to study the effect that food and nutrition knowledge of the mothers had on the use of presweetened cereals. The sample was divided into subgroups of families with children older than the preschooler and families with no older children. In the first group, the mothers' food and nutrition knowledge was positively associated with behavior regarding the use of presweetened cereals. In the second group where the preschool children were the oldest children in the family, the mothers' food and nutrition knowledge was not related to their cereal purchasing behavior. The food and nutrition knowledge test scores for both groups were similar. However, other factors appear to influence how the mothers from these two groups will apply this knowledge.

A Presweetened Choice

For food and nutrition education to be of value, homemakers need to be motivated to use and be capable of applying their knowledge of food and nutrition to the needs of their families. Mothers of preschool children do not consistently use their food and nutrition knowledge when selecting foods for their families. In several studies, the homemaker's information about food purchases and the nutrient needs of the family was related to the mother's formal education (1-4). However, such additional factors as family income, occupation of the parents, size of family, cost of food items, family preference, etc., also influence food behavior (5, 6).

The foods the mother makes available in the home and the mother's use of the food are influenced by her beliefs, attitudes, and knowledge of food and nutrition (7, 8). The mother of the preschool child usually has the primary responsibility for introducing the child to new foods and for helping the child to develop food patterns (9). Children about five years of age frequently attempt to influence food purchases with cereal being requested often and parental yielding occurring most of the time (10, 11).

In this investigation the relationships between the following are analyzed: mother's food and nutrition knowledge, mother's perception of her child's preference for presweetened cereals, family purchase of presweetended cereals, child's actual preference for presweetened cereals. Families of preschool children having high socioeconomic status were selected for the study because they are regarded as innovators in the use of new products (12) and few studies had been made of this group. The sample was divided into two subgroups to investigate the influence that experience with older children had on the mother's application of her food and nutrition knowledge.

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Mothers and Children Interviewed

Thirty mothers and their preschool children served as subjects for the study. The children attended a private nursery school in an urban area. The sample was "self-selected" on the basis that each mother had to agree to be interviewed and had to allow her child to participate in the study.

Each mother interviewed in her home provided the following data: the mother's food and nutrition knowledge as determined from a test designed to measure application of food and nutrition knowledge to food practices; the mother's perception of the child's preference for presweetened cereal as determined from the number of presweetened cereals she mentioned as her child's favorites; the percentage of cereals in the home which were presweetened; years of formal education of the mother; the mother's age; and the estimated annual family income.

The preschool children were interviewed individually by the investigator while attending the private nursery school. For each child the interview was administered twice with a minimum two-week interval. During the interview session, the child rated and ranked six dry breakfast cereals, representing all types of commercial cereals. After tasting the cereals, the child rated them using a five-point facial hedonic scale. Using the same cereals, the child ranked them according to the ones she/he would choose as favorites of her/his "own child." The highly correlated rating and ranking scores were combined to serve as the presweetened cereal preference of the child.

For analysis, pairs of mothers and preschoolers were divided into those with older children in the family and those in which the preschool child was the oldest.

All data from the interview schedules were coded and punched on data cards for subsequent analyses. A t-test ($p < 0.05$) was used to determine the significance of differences relating to demographic variables between the two groups. Pearson product-moment correlation coefficients were used to determine the linear association among the factors investigated (13). The 0.10 level of significance was chosen to test for statistical significance because the exploratory nature of this investigation involved finding possible existing relationships. This lower level of significance allowed the identification of some factors which, while possibly only weakly significant here, would not be omitted from subsequent research with larger sample sizes and different subgroups. "R" values greater than 0.35 and 0.34 were significant for the families with older children and those with no older children, respectively.

All of the children in the study, which was conducted in March, had been in the preschool program since the beginning of the school year. Children entering the school had been screened by school personnel to make sure that they did not have learning disabilities or emotional or discipline problems. The philosophy of the school was to encourage the children to express themselves.

Two Family Subgroups

In 14 families, children older than the preschool child were present in the home; and in 16 families, the preschool child was the oldest or only child. The children ranged in age from four years two months to five years three months with a mean age of four years seven months (± 3.9 months).

A summary of selected family characteristics is given in Table 1. The mothers of the children ranged in age from 26 to 46 years with a mean age of 33.7 years (± 4.5 years). All mothers had completed high school; 97% had some form of advanced education or training. Sixty-three percent of the mothers had completed a baccalaureate, 17% had completed a master's degree, and 3% had completed a doctorate. Of the 30 mothers, only 6 were employed; five were employed part-time and one was employed full time.

Approximate annual family incomes ranged from $11,000 to $30,000 or above. Compared to the annual earnings of other families in this urban area, 13 of the participating families were in the upper 3.7% of the population, 23 families were in the upper 14.1%, 29 families were in the upper 24%, and all families were in the upper 35.5% income category (14). On the basis of level of education and income, the sample was from a high socioeconomic, professional segment of the general population.

The demographic data in Table 1 reveal that the mothers who had children older than their preschool children were similar to mothers with no older children except for the age of the mother. The mothers with older children were an average of 4.3 years older than the other mothers. The education level, family income, number of children in the family, and score the mother received on the food and nutrition knowledge test did not differ significantly between the two subgroups.

For both groups in this study, the mother's knowledge about food and nutrition was related positively to her education level (Table 2). The relationship between formal education and cognitive information regarding food and nutrition has been shown by other researchers (2, 3). Although scores on a food and nutrition knowledge test did not vary significantly for the two groups of mothers (Table 1), the apparent application of the mothers' knowledge to food behavior was different (Table 2).

Families with Older Children

Demographic variables. The food and nutrition knowledge of mothers with children older than the preschool subject was related positively to the mother's age, the family income, and the mother's education level. In addition to these demographic variables the food and nutrition knowledge of the mother was related to the mother's behavior regarding food patterns of presweetened cereals.

Perception of child's preference. In families where older children were present, both the mother's food and nutrition knowledge and her education level had a negative association to the mother's perception of the presweetened cereals liked by her child. The mothers with high food and nutrition knowledge test scores and high education levels appear to have perceived that their children did not care for presweetened cereals. With mother's food and nutrition knowledge and education level positively associated with one another and both negatively associated with the mother's perception of the child's preference of presweetened cereals, these data suggest that the mother's perception of what was liked by her preschool child may have been biased by her concept of the food value of presweetened cereals. In these families with older children, the mother's food and nutrition knowledge and her education level were the only variables which had a significant association to the mother's perception of her preschool child's presweetened cereal preference.

Percentage of presweetened cereals purchased. When older children were in the family, the mother's food and nutrition knowledge was associated negatively with the percentage of presweetened cereals purchased for the family. Mothers having high food and nutrition knowledge test scores purchased a lower percentage of presweetened cereals. These mothers may have experiences in planning, purchasing, and preparing foods for their families that have become more established family food patterns. These established patterns may be less susceptible to new product promotion, such as media advertising of presweetened cereals. These results also indicate that mothers with limited knowledge about food and nutrition not only perceived that their preschool children liked the presweetened cereals, but that they also purchased a higher percentage of presweetened cereals for their families. In families where older children are in the home, an association between food and nutrition knowledge and presweetened cereal purchases does exist.

Child's preference for presweetened cereals. Although the food and nutrition knowledge of the mother was not related to the child's preference for presweetened cereals, the data do indicate that the percentage of presweetened cereals purchased was associated positively with the child's preference. Familiarity is recognized as one of the determinants of food preferences (15). In families where fewer presweetened cereals were available in the home, the preschool child had a lower preference for the presweetened cereals. These results suggest that the food and nutrition knowledge of the mother may have an indirect effect on the cereal preferences of the child.

When the Preschool Child Is Oldest

The relationships of food and nutrition knowledge with the food behavior variables tested were not the same in families having no older children as those with older children. Even though food and nutrition knowledge was related to the mother's education level, it was not associated with the purchase of presweetened cereals or with the child's preferences for presweetened cereals. However, other variables related to mother's perception of her preschooler's cereal preferences, purchase of cereals, and the child's cereal preference, are evident.

Perception of child's preference. Mothers whose preschool child was the oldest or only child had a positive association between her perception of her child's presweetened cereal preference and the child's cereal preference. The attention of these mothers was

Table 1 Selected family characteristics of families with older children and families with no older children.

Family Characteristics	*Older Sib Families n = 14 Mean ± S.D.*	*No Older Sib Families n = 16 Mean ± S.D.*	*t-Values*
Mother's age (years)	35.9 ± 4.3	31.7 ± 3.7	2.9
Mother's education level (years completed)	15.5 ± 1.2	15.9 ± 1.8	0.7
Food and nutrition knowledge (test scores)	328.7 ± 41.4	342.3 ± 36.3	0.9
Family income (upper %)[2]	7.0 ± 11.0	7.8 ± 11.9	0.2
Number of children	2.9 ± 0.9	1.8 ± 0.6	1.5

[1] $p < 0.01$ (two-tailed test) [2] Upper % income compared to Knoxville families

Table 2 Correlation matrix of selected family characteristics and presweetened cereal patterns for families with older children and families with no older children[1]

	Mother's Education Level	*Family Income*	*Mother's Age*	*Mother's Perception of Child's Preference*	*Percentage Purchased*	*Child's Preference*
Mother's food and nutrition knowledge	0.63*	0.36*	0.63*	-0.41*	-0.35*	-0.23
	0.56*	0.26	0.00	-0.09	0.26	0.00
Mother's education level		0.07	0.28	-0.37*	-0.12*	-0.44*
		0.04	-0.37*	0.29	-0.12	0.13
Family income			0.07	-0.14	0.09	-0.13
			0.13	-0.01	0.45*	0.34*
Mother's age				-0.37*	-0.32	-0.44*
				-0.44*	-0.14	-0.13
Mother's perception of child's presweetened cereal preference					0.33	-0.02
					-0.06	0.36*
Percentage of presweetened cereals purchased						0.39*
						0.03

[1] The top number represents the correlation for the families where there were children older than the preschool subject. The bottom number is for the families in which the preschool subject was the oldest (or only) child in the family.
*$p < 0.10$

more often undivided between children and therefore more completely directed toward the young child. Her interpretation of the preschool child's expression of food preferences seemed to be based upon the child's own reaction to the cereals. In contrast, mothers with older children had experiences with the older siblings that might cause her to expect certain behavior and food preferences of the preschool child. In situations where a child younger than the preschooler was present, the preschool child's preferences may have been magnified in an attempt to influence the cereal preference of the younger sibling.

Percentage of presweetened cereals purchased. The actual percentage of cereals purchased in families whose preschool child was the oldest was positively associated with family income. Families with higher incomes purchased a higher percentage of the presweetened cereals regardless of the food and nutrition knowledge of the mothers. Although all of the families in the study were upper-middle income, the families with the comparatively lower incomes selected cereals other than the presweetened varieties. At the time of the study, the presweetened cereals were approximately one-third more expensive than other types of cereals.

Child's preference for presweetened cereals. In addition to the child's presweetened cereal preference being related to the mother's perception of the child's cereal preference, the child's preference was associated positively with family income. As family income relates to percentage of presweetened cereals purchased and to the child's presweetened cereal preference, the availability of the presweetened cereals in the home may indirectly be affecting the child's food preferences.

Factors other than the mother's food and nutrition knowledge may stimulate food behavior affecting use of presweetened cereals. During the interviews, the mothers mentioned television commercials most frequently as a major influence on their children's cereal preferences. However, it was found that the child's familiarity with television cereal commercials was not associated with the preschool child's actual cereal preference for the subgroup where the preschool child was the oldest. Perhaps the mother's interpretation of the effect television commercials had on her preschool child was influenced by a perception of these commercials depicting young children enjoying the presweetened cereals.

Education Programs

These results indicate that preschooler's mother's use of food and nutrition knowledge when purchasing cereals is influenced by the presence of children in the family older than the preschool child. When designing food and nutrition education programs for mothers of preschoolers, the family composition should be considered. For mothers with older children, food and nutrition information and reinforcement of the value of their experience should be combined. For mothers whose preschool children are the oldest in the family, the food and nutrition information should be supplemented with techniques to help the mothers develop skills for using the information.

Acknowledgment

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MODIFICATION OF VEGETABLE-EATING BEHAVIOR IN PRESCHOOL CHILDREN

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Carol L. Ireton and Helen A. Guthrie

A behavior modification technique appeared to increase cooked vegetable consumption among preschool children more than did a traditional technique, varying the method of vegetable preparation.

The pattern of eating established during early childhood is believed to affect food choice and thus, to some extent at least, nutritional status throughout life. Assessments of the adequacy of the preschool child's diet have shown that vitamin A and ascorbic acid are two nutrients available often in less than recommended amounts to children of this age (1, 2). Other studies (2-6) have indicated that preschool children are reluctant to eat, or even taste, vegetables which are excellent sources of vitamin A and—to a lesser extent—ascorbic acid. Such observations suggest a need to study methods of increasing vegetable consumption of preschool children.

Traditionally, modification of the method of preparation has been the accepted procedure in attempts to enhance the acceptance of vegetables. With the exception of a study by Augustine et al. (7), there appears to be little experimental evidence that differences in the method of preparation influence the degree of acceptance of vegetables. Lowenberg (8), on the basis of her extensive experience feeding groups of children, observed that preparation methods used to modify or soften the flavor of vegetables—primarily cooking in larger amounts of water—resulted in an increased acceptance.

Recently, behavior modification has been identified as an effective method of stimulating desired eating behavior in anorectic teen-age girls. This method of psychotherapy involves rewarding a desired response (reinforcement) and withholding reward when an undesired response appears (9). The use of a token system of reinforcement, as a technique of behavior modification, has provided an effective method for shaping behavior in preschool children (10). To our knowledge, however, no studies have been reported in which this technique has been used to shape eating behavior in children of this age group.

Accordingly, the present study was undertaken to investigate and assess the effectiveness of variation of method of preparation and behavior modification as two methods of increasing the consumption of cooked vegetables rich in vitamin A or ascorbic acid as part of the noon meal by preschool children.

Procedure

The investigation was conducted in The Pennsylvania State University Nursery School. Nineteen children from 2 to 5 years of age from similar lower socioeconomic backgrounds served as subjects. Children ate their noon meal together at school at approximately 11:30 a.m. The children followed a familiar and consistent activity pattern in the morning. Throughout the study, they ate at child-sized tables with the same 3 or 4 children and 1 to 2 teachers. All meals were planned by a nutritionist and prepared by an experienced cook.

On the basis of data obtained from interviewing the mothers, five relatively unpopular or unfamiliar vegetables rich in vitamin A or ascorbic acid—asparagus, broccoli, cauliflower, spinach, and squash—were selected. Five lunch menus were planned to include—in addition to the cooked vegetable being tested—a protein dish, a raw vegetable, bread and butter sandwiches, milk, and dessert. The same basic menu was always used each time a specific test vegetable was served. These menus, which included only foods that had proven acceptable to children in this nursery school over a period of over 20 years, were repeated for each of the six weeks of the study. The day of the week on which a particular test vegetable and its accompanying menu was served varied from week to week.

There were two 3-week experimental periods: Phase I, in which methods of preparation of the vegetable were varied, and Phase II, in which the technique of behavior modification was employed with buttered vegetables.

During Phase I, each vegetable was prepared by three different methods. All test vegetables had one simple method of preparation in common—boiled or baked and served buttered. The other two preparation methods, which varied with the vegetable, are shown in Table 1.

In Phase I, a 20-gram portion of the cooked vegetable to be tested was served to each child in a marked plastic cup on the regular dinner plate, along with the other components of the main course. Teachers were instructed to make no verbal comments or nonverbal reactions to the cooked vegetables, although they could react to other menu items in their customary way. When the child had consumed all of the first portion of vegetable, he was given the option of having more. All succeeding portions weighed 20 grams, and the child could have as

TABLE 1
Preparation Methods Employed During Phase I

VEGETABLE	VARIATION I	VARIATION II	VARIATION III
Asparagus	Buttered	Cream sauce	Onion and ground beef
Broccoli	Buttered	Cream sauce	Shredded American cheese
Cauliflower	Buttered	Tomato sauce	Bread crumbs
Spinach	Buttered	Sweet and sour sauce	Lemon juice and hard cooked egg
Squash	Buttered	Honey	Applesauce

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many as he wished. The amount of vegetables eaten was calculated from records of the amount served and plate waste.

To prevent milk consumption from interfering with the appetite for cooked vegetables, children were limited to half a glass of milk during the main part of the meal. Additional milk was served with dessert. Similarly, bread and butter sandwiches were not served until after the main course of the meal had been completed. At the completion of the main course, dessert was brought into the lunch room. Only one dessert was offered at each meal; however, each child was allowed second servings.

In Phase II of the study, cooked vegetables were served buttered. A preweighed portion of the test vegetable was given to each child in his own marked cup along with the other components of the main course, as in Phase I. When he had finished eating this portion, the child received immediate positive reinforcement in the form of a token (a gummed sticker) and was given the option of having more of the vegetable. The child could have as many portions as he wished and continued to be reinforced with additional tokens for each portion he consumed. In addition, all teachers were asked to verbally reinforce the children for their vegetable-eating behavior.

The weight of the initial portion of the test vegetable was increased from 10 to 15 to 20 grams on succeeding test days. In each case, all servings, after the first one, were five grams heavier than the original one. This procedure was employed to determine whether the size of the portion would influence the number of servings or the total amount of vegetable the child would eat.

At the completion of the main course, fruit was available to all children for dessert; however, children with tokens could exchange them for a more popular dessert such as ice cream or pudding. Children who had one token received a small serving of the alternate dessert. If more than one token had been earned, a larger portion was given. Regardless of the number of tokens, each child was allowed only one serving of the popular dessert. Any child wishing more dessert was given fruit.

Results and Discussion

As shown in Figure 1, none of the variations in method of preparation in Phase I had any significant effect on vegetable intake. With the exception of squash, vegetables were preferred buttered, but even this form was relatively unacceptable, being eaten in small amounts by only a small number of children. Asparagus, cauliflower, and broccoli were less popular when served with cream sauce than in any other form. These results confirm those of Lowenberg (8)—that children like plain and unmixed foods.

In Phase II, the mean intakes of all vegetables were higher than in Phase I (see Fig. 2). A paired t-test of intakes during the two phases showed that for all five vegetables tested, mean intakes were significantly higher during the second phase, with the level of probability varying from 0.02 to 0.001 for different vegetables. Thus, token reinforcement proved a more effective means of stimulating vegtable-eating behavior than did modification of method of vegetable preparation.

The effect of varying the size of the initial portion of vegetables in conjunction with token reinforcement is shown in Table 2. The only vegetable for which initial portion size had any significant effect was broccoli. In this case, intakes were significantly higher ($p<0.05$) with a 15-gram portion than with a 10-gram initial portion.

A major problem encountered during the first phase of the study was the fail-

TABLE 2
Effect of Initial Portion Size on Vegetable Intake

Vegetable	Initial Portion Size 10 grams	15 grams	20 grams	Significance
	Mean Intake in Grams			P
Asparagus	12.4±12.5	15.6±13.9	20.8±18.6	ns
Broccoli	15.8±15.3[a]	42.5±38.3[a]	31.4±38.0	.05
Cauliflower	16.4±13.6	36.3±53.2	37.1±35.0	ns
Spinach	9.1±14.1	13.0±11.5	17.3±13.7	ns
Squash	24.5±24.7	35.4±32.4	42.9±43.8	ns

(Student's pooled t-test)
ns—not significant
a—mean intakes with like numeral superscripts indicate a significant difference at the level of probability shown in column significance

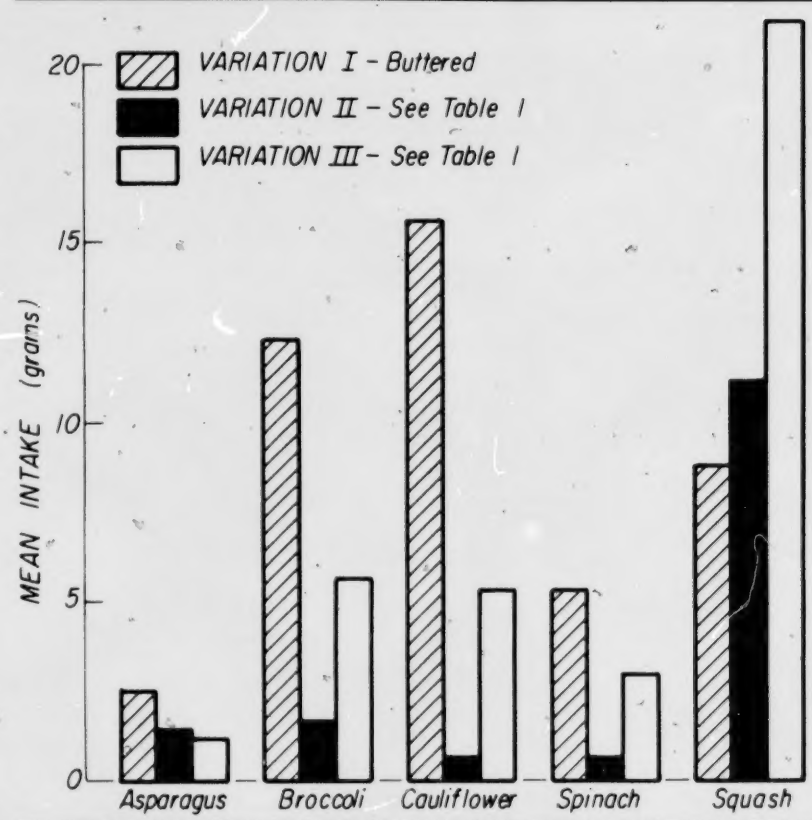

Fig. 1—Intake of vegetables with variation in method of preparation. Differences not statistically significant

TABLE 3

Comparison of Percentage of Children Tasting Cooked Vegetables in Phase I and Phase II

VEGETABLE	PHASE I VARIATION	%	PHASE II VARIATION	%
Asparagus	Buttered	25	10 grams	81
	White sauce	25	15 grams	93
	Onion and ground beef	29	20 grams	69
Broccoli	Buttered	29	10 grams	71
	White sauce	27	15 grams	73
	Shredded American cheese	29	20 grams	64
Cauliflower	Buttered	50	10 grams	79
	Tomato sauce	08	15 grams	69
	Bread crumbs	36	20 grams	85
Spinach	Buttered	31	10 grams	57
	Sweet and sour	07	15 grams	71
	Lemon juice and hard cooked egg	33	20 grams	69
Squash	Buttered	31	10 grams	85
	Honey	40	15 grams	81
	Applesauce	73	20 grams	67
All vegetables		32		74

An intake > 1 gram was considered "tasting"

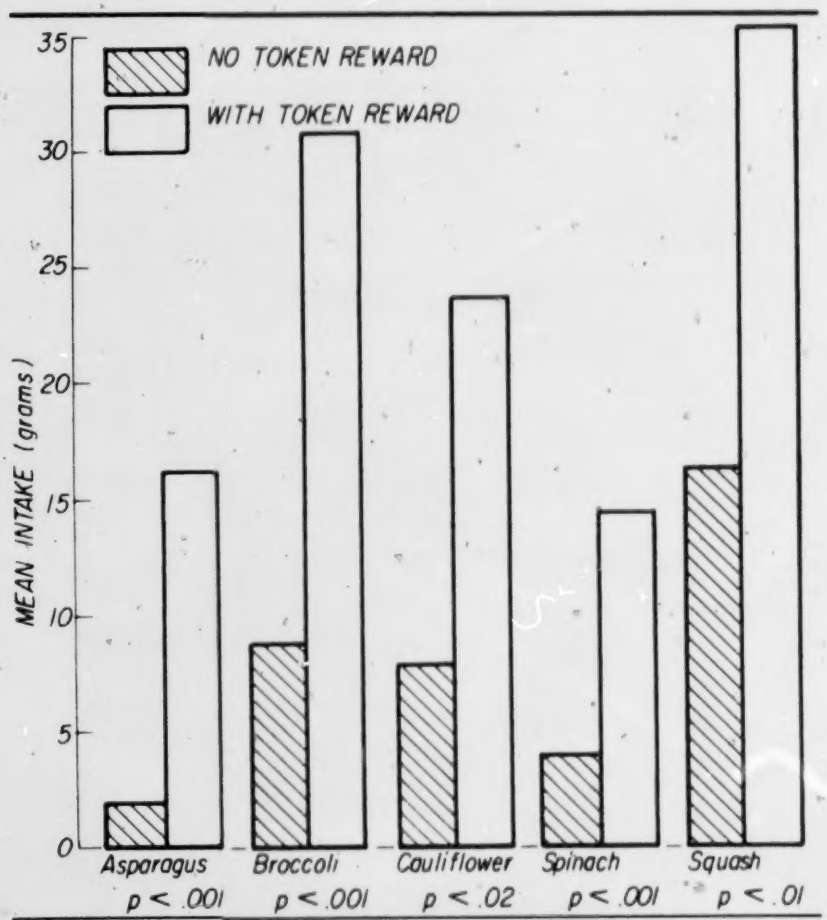

Fig. 2—Comparison of intake of vegetables in Phase I (variation of method of preparation) and Phase II (behavior modifications). Significance of differences based on paired t-test (n = 19).

ure of children to taste cooked vegetables, regardless of method of preparation. The percentage of children tasting cooked vegetables averaged 32% and ranged from 7 to 73% on different days. However, in Phase II, when children were given reinforcement, participation increased to an average of 74% with a range from 57 to 93%. A comparison of the percentage of children tasting cooked vegetables in Phase I and Phase II is presented in Table 3. Student's t-test showed these differences to be highly significant ($p<.001$). Thus, it appears that in addition to leading to an increase in the amount of vegetable consumed, behavior modification techniques prove an effective means of stimulating children to taste cooked vegetables.

Children's consumption of cooked vegetables was evaluated during both phases of the study in relation to their vegetable preferences reported by their mothers as "likes," "dislikes," and "never tasted." During Phase I, vegetable intakes did not vary with differences in the mother's assessment of her child's preferences. However, during Phase II, children whose mothers reported that they liked a vegetable ate significantly more ($p<0.02$) than did those whose mothers said they disliked it. Those who had never tasted a vegetable ate almost as much as those whose mothers reported they liked it. Regardless of whether mothers reported that children liked, disliked, or had never tasted a vegetable, the consumption of vegetables was greater in Phase II than in Phase I.

Although no attempt was made to assess the effect of the withdrawal of token reinforcement during the experimental period, it was noted that cooked vegetable consumption dropped following the termination of the study. However, a subjective observation of plate waste indicated that vegetable consumption remained considerably higher than it had been prior to the study.

The findings of this study indicate that token reinforcement is an effective method of shaping desired vegetable-eating behavior in preschool children studied under experimental conditions in an institutional setting. Whether this technique could be effectively applied to individual subjects in a home environment remains to be determined. There the reinforcement could be much more individualized to consist of a reward specially meaningful to the particular child, such as pennies, a special privilege, a favorite food, a sticker, or a small toy. Regardless of the reward chosen and the

behavior which one seeks to modify, the importance of immediately and consistently rewarding the desired behavior and ignoring the behavior that does not conform to expectations cannot be overemphasized.

Summary

Variation of method of preparation and behavior modification were investigated as two methods of increasing the frequency with which preschool children ate cooked vegetables rich in vitamin A or ascorbic acid. While variation of method of preparation had no significant effect on vegetable intake, the use of token reinforcement to modify vegetable-eating behavior proved effective. The token reinforcement system in which the child was given an immediate reward (a gummed sticker in this study) after eating a specified amount of vegetable was thought to be responsible for an increase in the mean intake and the frequency with which the children tasted cooked vegetables.

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FOOD ATTITUDES AND SNACKING PATTERNS OF YOUNG CHILDREN

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Nancy R. Beyer and Portia M. Morris

Food habits and snacking patterns of 44 well-nourished Michigan children examined during preschool and early elementary school years were observed to be relatively constant. Implications for nutrition education are discussed.

Summary

Food likes and dislikes and snacking patterns of 44 children were examined during the preschool period and followed up during early elementary school years. Home interviews with the children's mothers revealed that most considered their child's diet nutritionally adequate. This was borne out by analysis of food intake records, which showed that at both periods children's nutrient intakes were very good.

Meat, especially chicken, was the favorite food of the children—named by 40% (preschool period) and 50% (elementary period)—followed by pizza and spaghetti. Snacks provided proportionately more calories than protein, and there was a tendency for the children to consume less food as snacks as they became older.

This study points out the importance of teaching the foundations of good nutritional practices early in life and illustrates that nutrition education should be aimed at the whole family.

No matter how nourishing the food served to a child may be, it is the food which is eaten and absorbed that is responsible for growth and well-being. Several studies have tried to determine what influences the food attitudes of children. Breckenridge (1) states that an understanding of children's food preferences and prejudices and of their dynamics can be of value both to those who plan and supervise the feeding of children and to those who are engaged in promoting sound food habits through nutrition education. According to Clark (2), food habits are a result of education, sociological background, and present situations.

Many people are interested in the study of why people eat what they do and how this affects their physical growth and health. Such studies have often been cross-sectional projects which have evaluated the food habits of a given population at a given time. Beal (3) has proposed that longitudinal studies give a better understanding of the relationship between dietary intake and growth during childhood as well as the effect of dietary habits on the health of the individual as an adult.

In looking at the eating habits of preschool children, Kerrey et al. (4) suggested that food practices and attitudes established during the early years are believed to affect food choice and, consequently, nutritional status throughout life.

This study looks at the dietary habits of a group of children during the preschool years and again during the early elementary school grades. It specifically looks at the food likes and dislikes and the snacking patterns of these children.

Methodology

Forty-four children were involved in this study. The criteria for participation were that:

1. They had taken part in an earlier study of dietary habits of preschool children (5, 6);
2. They could be located;
3. They were currently attending elementary school; and
4. Their mothers were willing to keep two 24-hour food intake records and participate in an interview of the child's dietary history.

All of the children had attended the Michigan State University Laboratory Preschool at some time between the ages of three and five. At that time, a home interview relating to family and health characteristics, food habits, and dietary history was conducted with the mother of each child. In addition, one to three 24-hour food intake records were kept for each child. In 1971-72, a similar interview (7) was conducted on the same children during the early elementary school years (ages six to eight). Two 24-hour food intake records were kept for each child at this time. The period of time between the two interviews ranged from two to four years, with the majority being three years apart.

There were 18 boys and 26 girls in this study. These children came primarily from white, middle-class homes.

The food intake records were analyzed by computer using USDA key punch cards (8), and additional information obtained from Watt and Merrill (9), Church and Church (10), and manufacturers of prepared food products. Values for intake of selected nutrients were compared with the 1968 Recommended Dietary Allowances (RDAs) for 3 to 4- and 6 to 8-year-old children (11).

TABLE 1
Disliked Foods by Categories (%)

	Preschool*	Elementary School**
Cooked vegetables	50.9	47.7
Mixed dishes	14.1	10.7
Meat	8.8	7.7
Liver	7.0	12.4
Raw vegetables	5.3	6.2
Cottage cheese	3.5	1.5
Fish	3.5	6.2
Fruit	3.5	1.5
Eggs	1.7	4.6
Milk	1.7	1.5

* Reported by mother.
** Reported by child.

Results

Home Interview. Analysis of the questionnaires revealed most mothers thought that their child's diet was nutritionally adequate, although many could suggest ways for improvement. Most frequently the food group insufficient in the children's diets was vegetables.

The mothers of the preschool children reported that cooked vegetables, liver, and mixed dishes were the foods most often disliked. This trend continued into the elementary school years (see Table 1). Mothers of 70% of the children reported that at least one food item was disliked sufficiently that her child refused to eat it.

During the preschool years, approximately 40% of the children liked meat best. By elementary school, a little more than 50% of the children said that meat was their favorite food. Of these, 25% specifically mentioned chicken. Next in

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TABLE 2
Most Favorite Food by Categories (%)

	Preschool*	Elementary School**
Meat	38.8	52.3
Snack item	16.7	4.5
Dairy	11.1	4.5
Mixed dish	11.1	20.4
Bread, cereal	5.5	4.5
Dessert	5.5	9.1
Fruit	5.5	—
Vegetable	5.5	4.5

* Reported by mother.
** Reported by child.

popularity were mixed dishes, such as pizza and spaghetti. This is contrary to Breckenridge (1) who reported dislike of meat mixtures by 5 to 12-year-old campers. Table 2 compares the likes of the children both in preschool and in elementary school. It should be noted that these declared favorite foods may have been affected by the fact that these data were collected in the fall on both occasions.

The frequency of snacking for the elementary school child is summarized in Table 3. Snacks were most frequently consumed after school and from home supplies.

Dietary Data. On the basis of the dietary intake data, these children appeared to be eating well at both points in time. The 24-hour food intake records were analyzed for selected nutrient content percentage of the RDAs and the pattern of calorie and protein consumption. The mean intake of the children as a percentage of the RDAs is shown in Table 4.

In order to determine the contribution of snacks to the total nutrient intake, the mean percentage of calories and protein consumed as meals and as snacks was computed (see Table 5). The results show that snacks eaten provided a larger proportion of calories than of protein. In other words, a larger percentage of the protein intake is consumed at mealtime. This table also shows that the preschool child consumed more food as snacks relative to this total intake than did the elementary school child.

TABLE 4
Mean Intake as Percentage of RDA (± Standard Deviation)

	3 to 4-Year-Old Children	6 to 8-Year-Old Children
Calories	122.1 ± 37.1	94.3 ± 22.9
Protein	201.6 ± 76.7	202.9 ± 55.9
Vitamin A	198.8 ± 240.6	127.0 ± 74.4
Ascorbic acid	270.4 ± 173.5	214.9 ± 109.3
Niacin*	218.6 ± 85.5	178.0 ± 49.3
Riboflavin	223.1 ± 108.4	171.8 ± 44.4
Thiamin	138.6 ± 55.8	120.9 ± 43.0
Calcium	129.0 ± 59.2	112.7 ± 35.5
Iron	83.2 ± 36.9	104.2 ± 27.7

* Calculated on the assumption that 1% of the dietary protein was tryptophan and that 60 mg tryptophan yields 1 mg niacin.

The frequency in all dietaries of various snacks is shown in Table 6. Many children snacked on more than one item. Although there was not very much difference in the character of the snack foods between the two age groups, elementary school children consumed proportionately more fruit juices and milk and less soft drinks, popcorn, and potato chips than they did several years earlier.

Discussion

The eating habits of these children were fairly constant from preschool to school age. Meat was the most popular food at both ages, while cooked vegetables were the least favorite both times. Although the school age children consumed slightly more snacks as preschoolers, the character of these snacks was fairly constant. This implies that practices established with very young children provide the foundation for nutritional status later in childhood. This also underlines the desirability of training children to eat the right foods at an early age. A child's food consumption patterns are frequently those of his parents (12). As a young child, he imitates the family food habits (13), and these become his own. Therefore, it is important that parents provide a good example right from the start. Hill (14) has aptly stated that it is easier to develop good food habits in young children than it is to correct poor habits as children grow older. This requires that parents know and practice good food habits from the time their children are born, if not before.

Snacks have become a very important part of our food pattern (13). The results of this study suggest that snacking provides a slightly greater percentage of calories and protein in the diet of the preschool child compared to the elementary school child (see Table 5). The decreased percentage of calories and protein eaten as snacks in elementary school may reflect an increased appetite at mealtime. After-school snacks are regularly consumed by this age group, but subsequent play results in a good appetite at dinnertime for many of the children. Snacking patterns of the two age groups were surprisingly similar. The older group showed a lower intake of pop and potato chips on the days recorded than on other days, although there is no evidence to suggest why this occurred.

TABLE 3
Frequency (%) of Snacking by Elementary School Children

Time of Snack	Almost Always	Occasionally	Never
Between lunch and dinner	86.3	13.7	—
After dinner	43.2	25.0	31.8
Between breakfast and lunch	9.1	18.2	72.7
Before breakfast	4.5	2.3	93.2

In the study preschoolers did not appear to like vegetables, although raw vegetables were liked better than cooked. Eighty-one percent of the preschool children listed a vegetable as his most disliked food. This trend has continued to the elementary school years in these children. Breckenridge (1) also found a great dislike for vegetables among elementary school children.

Conclusions

These children appeared to be well-nourished both as preschoolers and as elementary school children. Although a few individual changes were noted in food habits, most of the children showed a high degree of consistency from one period to the next.

Vegetables were the least favorite food of the majority of the children. However, the unpopularity of liver showed a noticeable increase over time. In contrast, mixed dishes were much more acceptable to the older child than they were to the preschooler.

The elementary school child appeared to eat a smaller proportion of his total food intake as snacks as compared with the preschool child. The types of foods eaten as snacks were consistent from preschool to elementary school for most individuals.

These data show a great degree of similarity between food habits of children during the preschool years and in elementary school. This implies that the preschool years may be the training

TABLE 5
Mean Percentage of Calories and Protein Consumed as Meals and Snacks

	Preschool		Elementary School	
	Meal	Snack	Meal	Snack
Calories	78.2	21.8	82.6	17.4
Protein	87.8	12.2	90.6	9.4

ground for the quality of diet in later life. If so, nutrition education needs to be aimed at the total family as a whole—children and parents—in order to improve the nutritional status of a population. Recognition of nutrition education as a part of life-long education is overdue.

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TABLE 6
Percentages of Total Snacks Consumed by Children

	Preschool	Elementary School
Breads, cookies, cereals	30.9	29.4
Sweets (candy, pop, dessert)	21.2	20.9
Fruits, juices	18.0	23.2
Milk	12.3	15.7
Non-carbonated, flavored drinks	9.3	6.6
Nuts, popcorn, potato chips	6.0	2.4
Vegetables	2.5	1.4

Pathways To Preschool Nutrition Education

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JANICE MARIE SMITH works with the Head Start Leadership Development Program, Texas Southern University, Houston, Texas 77004, where she compiled the workbook "Let's Have Fun Teaching Nutrition to Young Children."

Since 1973 Head Start programs have been required to integrate health and nutrition education into the program of daily activities for children. Everyone agreed that this could and should be taught at the preschool level. However, it was not clear what and how much should be taught, and experience in the field showed that little was being done.

In spring 1974 Margaret Guy, health liaison specialist with the American Academy of Pediatrics (AAP) and Region VI Office of Child Development, brought the problem to the staff of Head Start Leadership Development Program (LDP) at Texas Southern University in Houston. After much discussion and consideration, the AAP contracted with LDP to begin developing ways to teach health, nutrition, and safety to Head Start parents, staff, and children. Only well-informed staff could adequately teach children and only well-informed parents could assure carryover into the home. The immensity of the task before us was almost impossible to imagine, but begin we did.

I worked primarily in developing materials for children so this article will focus on three aspects of that part of the project: the process of developing materials, methods of training staff to use materials, and the problems and insights discovered so far.

First let us explore the process of developing materials. Our staff met with a local pediatrician and a nutrition specialist to determine what were the most important concepts to teach preschool children. We also did a lot of library research on nutrition, food handling, preventive medicine, hygiene, and safety. We visited the local and state health departments, day care centers, and school supplies companies to determine what materials were available. We contacted health departments in other states, food processing companies, the National Dairy Council, the National Meat Board, the U.S. Department of Agriculture, home economics and nutrition departments at several universities, and the National Consumer Product Safety Commission.

We collected a wealth of information, posters, and pictures but to our dismay found little which was appropriate for preschool children. After developing the scope and sequence of our curriculum, we concluded that much of the material would have to be made from scratch. The following criteria for materials evolved considering the nature of preschool children and the various Head Start settings:

1. Must teach concepts accurately.
2. Must teach in a developmentally appropriate way.
3. Must be easily duplicated or readily available.
4. Must be inexpensive and durable.
5. Must be easily storable.

These criteria seemed appropriate and necessary but they complicated the task immeasurably. The LDP staff divided the work into manageable portions, and I began to concentrate on developing ways to teach nutrition to young children. The remainder of this article deals mostly with nutrition education, but the *process* is comparable to development of ideas in other content areas.

It seemed plausible to design activities to teach nutrition in every interest area in a preschool classroom. The next step was to dip into educators' bag of tricks for types of activities. Out came coloring books, glue, stickers, poster board, song books, game books, recipe books, a sewing machine, scraps of cloth, etc. My desk resembled Santa's workshop for the next several months. Sample games were collected and modified from commercial things designed for older children. Others were created. Life was breathed into scraps of junk and they became "very knowledgeable" puppets. Original stories, poems, finger plays, and puppet scripts began to take form. Then came piloting of materials with real children and evluation of the results. Some things had to be thrown out, others modified, but most were quite successful.

The next step was to draw patterns and write instructions for making and using materials. The first draft grew and changed as we gained experience by using it in training sessions with Head Start personnel. Parents and all levels of staff contributed both positive and negative feedback as well as their own ideas.

Over the past two years more than 1,000 Head Start health and nutrition and educational workers have met for training sessions in several cities and towns across the southwestern United States. The presentations were varied because of different backgrounds and levels of sophistication of the workshop participants. Health personnel need more child development and educational techniques explained while teaching staff need more nutrition background.

The workshops were generally one to one and a half days long. In each there was a lecture to explain appropriate background information, followed by demonstrations with participants actually taking part in activities. Some audiovisuals were used. Discussions

played two important roles: clarification of concepts and objectives for the participants and generation of constructive criticism and new ideas for the trainer. If time permitted, participants also constructed some of the materials. In some cases nutritious snacks replaced the normal coffee and doughnuts served at other types of training sessions. At one workshop, fruit was awarded to winners of the nutrition games. Evaluations show that the workshops were enjoyable as well as informative and practical. These evaluations were an important part of an ongoing effort to develop and refine the repertoire of activities. However, the most rewarding experience is to visit Head Start classrooms across the Region and witness the enthusiastic implementation of our brain-children.

Let's take a look around an imaginary Head Start classroom and see how nutrition can be learned in each interest area. In the language arts area there are food puppets made of poster board and tongue depressors. Patterns for them were made by tracing food pictures from coloring books and adding facial features and feet. Sample puppet scripts are in the corner, but creative teachers give each puppet its own personality and repertoire of nutrition information. Miss Carrot, for example, is always worrying that the children will not eat her while she is fresh. She knows she will lose her vitamins if she gets too old. (That is, she knows if the teacher using her knows). Mr. Potato often has to stop arguments among the puppets over who is most important. He knows that children need a variety of food to stay healthy. Also in the language arts area there are flannel board characters made of poster board with sand paper on the back. Original stories, poems, and finger plays were written to teach where milk and bread come from, how foods grow, and what part they play in a balanced diet.

Let's move on to the manipulative area. Board games, which are simplified forms of commercial games, teach food identification. Board spinners, large dice, and cards are made of poster board and fruit and vegetable stickers. All are laminated, covered with clear contact paper, or sprayed with plastic. Cardboard puzzles are made from old boxes and food pictures from seed catalogs and discarded magazines. Matching games and food lotto are there to teach children to identify food in various forms. Children can make play dough models of the real fruit on the top shelf.

Food models, available from the National Dairy Council, are served to patrons of the dramatic play corner's restaurant. This food is "prepared" hygienically before being served because the teacher has talked with the children about sanitary food handling. Besides, the children want to keep Mr. Germ away from their food. (He is an ugly puppet who loves to make people sick and hates clean hands).

In the music area, tapes are available for listening. Familiar tunes are used but the words are different. More songs, also written to familiar music, are on index cards beside other tapes.

In the art corner, children can make paper sandwiches like the meat and cheese sandwiches they actually ate on a picnic. They can select balanced dinners by gluing food pictures on paper plates. The pictures are collected by parents from magazines and food container labels and sorted by the teachers in the basic food groups.

In the science area, beans are sprouting up in colorful

FRUIT MATCH

Number of players	1 - 2
Materials	Fruit board and cards with fruit names marked on them.
Play	Child matches cards to pictures on fruit board.

FRUIT HUNT

Number of players	2 - 3
Materials	Fruit cube, one set of cards less than the number of children playing.
Play	Place cards in center of table. Teacher rolls fruit cube. Children try to pick up a card which matches the fruit on top of cube. Roll cube until all cards are gone.
Winner	Child with most cards gone at end.

FIND THE FRUIT

Number of players	6 - 12
Materials	One fruit card and one ribbon for each player, one yarn ball.
Play	Tie one card on each child. Have children stand or sit in circle. Teacher gives ball to one child and says "Pineapple throw to Plum." The child must find another child whose card has a plum on it and throw the ball to him or her. Then "Pineapple" says "Plum throw to Lemon" and so on.

FRUIT BASKET UPSET

Number of players	6 - 15
Materials	One fruit card and one ribbon for each child playing, one less chair than the number of children playing.
Play	Tie a fruit card on each child. Place chairs in a circle and one child standing in the center. The child in the center says "Lemon change places with grapefruit." All the children who have lemon or grapefruit cards must try to get into a different chair. The child in the center tries to get into a chair. Whoever is left without a chair calls out two more fruits and so on. The child in the center can also say "fruit basket upset" and then everyone must change places.

VEGETABLE HUNT

Number of players	1 - 15
Materials	Wrap vegetables in foil (children can help). Hide vegetables in classroom. Find and eat the vegetables.

FARMER BROWN GAME

Number of players	6 or more
Materials	Farmer's hat, one food puppet for each child.
Play	Farmer puts on hat and points to a child. He stands up and names his puppet, e.g. carrot. Children sing to the tune of "Michael Rowed the Boat" Farmer Brown grew some carrots Alleluia Farmer Brown grew some carrots Alleluia (Repeat with other foods and children)

VEGETABLE TWISTER

Number of players	3 - 4
Materials	Vegetable discs, masking tape
Play	Tape discs to floor. Teacher says, "Nancy put one foot on corn." Nancy does it, then teacher says, "Put one hand on tomato." etc. Continue until child misses then move to next child with first child as leader.

LET'S GO SHOPPING

Number of players	3 - 10
Materials	None
Play	First player says, "I'm going shopping and I'm going to buy some cheese. Next player says, "I'm going shopping and I'm going to buy cheese and eggs." Next player says, "I'm going shopping and I'm going to buy cheese, eggs, and milk." Continue until someone cannot remember what is going to be bought. Start over.

HIDE AND SEEK VEGETABLES

Number of players	2 - 4
Materials	Line drawings of vegetables
Play	Put drawings in center of table face down. Teacher names a vegetable. First child turns over a sheet. It it is not the one named he replaces it face down. Continue until all the sheets have been picked up.
Winner	Player with the highest number of sheets at end of game.

These game examples are from "Let's Have Fun: Teaching Nutrition To Young Children," compiled by Janice M. Smith, developed at Head Start Leadership Development Program, Texas Southern University, Houston, Texas 77004.

pots. Children try out recipes, such as making a banana split with a scoop of cottage cheese, sliced bananas, yogurt topping, and a cherry for color. A stack of other nutritious recipes is kept in a pocket tacked on the shelf.

On the playground, some of the children play modified forms of popular games. For example, "What time is it, Mr. Fox?" is done with each child holding different fruit. They will say "What shall we eat today?" If the teacher says "banana," children holding a banana will take one step. This will continue until the teacher answers "fruit salad," at which all the children will run to the goal trying not to be tagged by the teacher. Afterwards, the children will eat all the game materials.

Before concluding, it seems only fair to discuss some of the problems incurred in the process. First, a question has surfaced as to who is responsible for health and nutrition education. Is it the health and nutrition staff or the teaching staff? Teamwork, of course, is the obvious answer, but teamwork takes time, effort, and cooperation. The latter two are and have always been plentiful in Head Start programs. Finding time in busy schedules remains a problem.

A second stumbling block to implementing these ideas is the time involved in construction of materials. Here we have found that the parent and volunteer components of the Head Start program can be most helpful.

A third problem is finding ways to bring the parents into the teaching process and implementing sound nutrition practices in the home. Several methods can be of help: (1) Establish lending libraries or add health and nutrition materials to already existing ones. (2) Use parent meetings to explain the function and purpose of the materials and to teach basic health and nutrition concepts. (3) Establish parent low-cost meal recipe exchange. (4) Send out newsletters or add articles to existing ones to keep parents abreast of what is being taught and why. (5) Send material packets home with the children. One half of a poster board makes a nice size envelope with ample room for game materials and instructions. (6) Involve parents in the collection of food pictures and the construction of materials. (7) Serve nutritious snacks with explanations at parent meetings. (8) Play adult nutrition games at parent meetings, e.g., bingo with food names and nutrition information on the cards instead of numbers. (9) Establish parent cooperative buying systems.

The last major problem is to develop more materials which take into account various ethnic backgrounds with their inherent food preferences.

We need more ideas, more evaluations, more effort, but we look to the future with hope. Head Start parents and staff at all levels underscored their ingenuity, enthusiasm, and willingness to cooperate. The original 11 workshops set up by the American Academy of Pediatrics mushroomed to over 30 requested by local programs. Head Start programs all over the Southwest Region are using the materials and creating their own. Parents enjoy making and using the materials with their entire families. Innovative modifications are popping up in Head Start centers everywhere. New ideas are eagerly shared with Leadership Development staff and we, in turn, pass them on to others. The possibilities seem limitless.

Vegetable Parade Persuades Children to Try New Foods

J. Nutr. Ed., 8:21-22, January-March, 1976

Richard Hofacker and Nancy Brenner

Vegetables were introduced to young children by dietitians from Kings County Hospital, Brooklyn, in a unique, award-winning way.

Pediatric patients at Kings County Hospital in Brooklyn were afraid to taste unfamiliar foods, so plate waste of vegetables was consistently high. A unique plan to reverse this trend was a winner of a 1975 Nutrition Action Award funded by The Potato Board. A colorful "Vegetable Parade" was prepared featuring nine staff dietitians and four head dietitians from the facility's 411 full-time and 72 part-time Dietary Department staff.

The parade is led by "Farmer Brown" who introduces the vegetables one by one, emphasizing the part each plays to make children "grow strong and beautiful like Catfish Hunter, Leontyne Price and the Champ Ali." When the whole crop of vegetables has been assembled, the group sings a variation of "Old MacDonald Had A Farm" to reinforce the nutritional message.

A tasting party follows the parade, where vegetables once refused are sampled with enthusiasm. Even more encouraging to the dietitians—a check several weeks after the vegetable parties reveals fewer vegetables left on plates.

Because of the success of the parade with in-patients, "Farmer Brown" and her vegetables have moved into the community with performances in schools and day care centers. Eight parades were held in an eight-month period, including the recent "Feeling Good" Health Festival, hosted by Dick Cavett at the Lincoln Center for the Performing Arts in New York. There the dietitians were received with enthusiasm by both children and adults in the audience.

The cost of the program—approximately $175—was covered by the $200 cash prize granted to the hospital in The Potato Board's first Nutrition Action Award competition in 1974.

BELOW: "Farmer Brown," who is really head dietitian Eunice Lewis, introduces each of the vegetables to the children. She coordinated the Vegetable Parade.

ABOVE LEFT: Selma Hoffman (left) who works in the dietary department office, designed and painted all costumes. "Corn . . . the ear that cannot hear" is head dietitian Lillie Nash. In addition to the name cap and drawing, she wears a yellow skirt, green shirt and tights and carries an ear of corn.

ABOVE RIGHT: As each vegetable stands before the audience of children, she tells them about her nutritional attributes and serving ideas. Popeye's favorite, spinach, is staff dietitian Bella Tomfelden who tells of the powerhouse of vitamins and minerals she can add to a meal.

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ABOVE LEFT: Each "vegetable" writes her own speech. Digna Diaz boasts of the energy boost that popular potatoes provide in French fries, chips and, for these Brooklyn youngsters, knishes.

ABOVE RIGHT: The children listen intently as staff dietitian Juliana Lucero tells that tomatoes' vitamin C is waiting for them in the tomato sauce on pizza as well as the fresh tomatoes in salads.

A vegetable tasting party follows the presentation. Paper plates with samples of the vegetables are prepared by the "vegetables" themselves, who encourage the children to try them.

The children usually dig into the vegetable samples with gusto. In the pediatric wards, some of the children may have little appetite because of illness, but some of the mental blocks against "strange" vegetables are reduced.

NUTRITION EDUCATION AND THE DEVELOPMENT OF LANGUAGE

J. Nutr. Ed., 1(1):12-13, Summer, 1969

Loretta Juhas

A unique teaching program for children: 2-years through elementary school age.

The California State Department of Education has a unique statewide program, Childrens' Centers. These centers supplement the homes by providing educational supervision and instruction for children from two years through elementary school age.

The mothers of these children must necessarily work in support of the family. These centers are open from 7 a.m. to 6 p.m. and operate throughout the year on a five day schedule. There are 26 such centers in San Francisco, with a 1600 enrollment. They are administered by the Children's Centers Division, a part of the Elementary Division of the San Francisco Unified School District.

Before discussing language development, it is helpful to explore the most effective methods of learning to choose the proper foods; the principal goal of nutrition education for preschool and primary age children. This is best accomplished by the daily serving of well-balanced, attractively served meals.

In the San Francisco Children's Centers, where the long day includes the serving of breakfast, lunch, and mid-morning and afternoon snacks, nutrition is of prime importance.

The meaning of mealtime in the centers involves more than feeding. It is an integral part of the curriculum, which makes it possible and easy for the children to learn to know and like a wide variety of foods. In addition to the meals, food preparation activities are planned to stimulate interest in nutrition. They are also used as vehicles for other learning.

Setting the Stage

The physical surroundings and atmosphere in which the food is served are just as important as placing the right foods on the table. This requires that teachers and children, both nursery and school-age, are comfortably seated at tables in small groups. The teacher is responsible for creating an atmosphere for learning.

Conversation is encouraged in this family-like group. There is no comparable, home-like situation in a day at the center, or in the classroom, that gives a teacher the same opportunity for knowing the children. The serving of food always stimulates conversation; adult chatter at a coffee break, for example.

Building the Vocabulary

To increase their vocabularies, children must be exposed to more extensive vocabularies than their own. In this, nursery-age children are greatly assisted by the teacher who speaks slowly, clearly and simply, and who fits the word or phrase to the appropriate object or action.[1]

With pre-kindergarten children, the teacher may review a menu by naming the foods on the table. Thus, she associates the object with the right sound. As the children repeat the word sounds after the teacher, they will perhaps offer a comment, such as that of a 3½-year old who said "Yummy, yummy, tongue," and her classmate asked "Whose tongue?" An elementary anatomy lesson naturally followed this conversational exchange.

When a new food appears on the menu, such as a fruit or vegetable that has come into season, the teacher talks about this food. Again, the children may be expected to comment on the food's color, taste and texture. They may perhaps ask questions.

For example, a group of four year olds discussing zucchini squash expressed concern for correct nomenclature. Conversation evolved into whether it was called "zucchini" or "squash." One child commented "I know, the outside is the zucchini and the inside is the squash."

Such comments provide the teacher with the opportunity to recognize and to correct erroneous concepts. Understanding the meaning of words as well as saying them is part of a child's progress in learning a language.

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The children are encouraged to say "thank you" and "please," and to ask for more by naming the food; such as "May I have more eggplant, please?" In this way, a child makes another use of language; to obtain what he wants and thus to satisfy his needs.

Curriculum Development

Most children have the opportunity to develop sufficient language to express their wants, but their daily experiences are so limited that they literally have "nothing to talk about." Motivation is built in when the curriculum evolves from the interest of children. And, if the curriculum includes a variety of good experiences, the children are provided with ideas and concepts which readily make self expression possible. They begin to develop the perception and problem-solving ability that are necessary for reasoning.

As these abilities develop, they learn not only to put thoughts into words, but to place thoughts in logical sequence. Conversation at the meal table often provides the imaginative teacher with clues toward attaining these objectives for the children.

At breakfast, a school-age child asked about the blood spot in her egg. She wanted to know why some eggs have these spots and others do not. Other children asked "Was there a chicken in the egg," and "Does it need a mother and daddy?"

The teacher then explained the fertilization process, then brought in fertilized eggs which were incubated and hatched at the center. One egg had prematurely cracked. The teacher opened this egg to reveal the fetus. One child said "We opened an egg because we knew it was going to die."

The children illustrated these experiences in art form, retelling the story to the teacher with the aid of their pictures. The teacher recorded their comments in picture captions.

Lessons in Cooking

Hatching the eggs did not complete the lesson. The cooking of eggs followed; scrambled, soft-cooked, hard-cooked, and deviled. Eggs were placed in boiling water, and at two minute intervals an egg was removed from the water and opened so that the children could see what had happened to the egg during cooking. They watched the minutes tick by and the mercury rise in the thermometer so that again, as in hatching eggs, they learned about the effects of time and temperature.

One child asked why heat and time applied in one instance resulted in a chick, and resulted in a cooked egg in another instance. Again, the teacher had the opportunity to explain and clarify the difference. Here, the teacher is given further opportunity to understand the child as he expresses his problems and asks questions, and to provide learning situations compatible to the ability and development of each child.

In this project, children also toured a poultry market, and read the book titled "The Wonderful Egg."[2]

Food Preparation

A finicky appetite may be tempted by involving a child in food preparation. The extent of the activity is determined by the ages of the children, the skill of the teacher, and the children's previous cooking experiences. Gore[3] states: "Functional activities are logical approaches to more systematic forms of listening, speaking, reading and writing which will follow according to each child's maturity and readiness for them."

The older nursery children at one center prepared peach melba topped with strawberries as part of their learning experiences with fruit. The resourceful teacher brought a strawberry plant to the classroom.

The class discussed the characteristics of the peaches and the strawberries, and the children described their texture, color and smell, and felt the fuzz of the peach skin. They then sliced the peaches and prepared their individual melbas.

While the teacher and the children were discussing the texture and the color of the peach, one child observed "It looks like a sunset." Learning to listen and to follow the verbal directions of the teacher are the first steps in language development.

In learning about different nationalities in San Francisco, school-age children at the same center made noodle dough for raviolis. At the same time, they were also learning to read recipes.

When lunch depends upon reading skills and the careful following of directions, and when the meal preparation includes the fun of mixing flour and eggs, rolling the noodles, and filling and cutting the raviolis, learning then becomes easy. Furthermore, the resulting raviolis were enjoyed by the entire class.

In the San Francisco Children's Centers, mealtime is an integral part of the curriculum. Nutrition education projects are planned within the total educational framework. These projects are not merely used for teaching nutrition, but as vehicles for other learnings such as language development.

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Nutrition Education for Preschoolers at the Shopping Mall

J. Nutr. Ed., 8:168, October-December, 1976

Marcy H. Kershner and Nancy S. Storz

A strong feeling that nutrition education should start at the preschool level prompted members of the Philadelphia Dietetic Association to sponsor a Nutritional "Story Book" Event for children at a shopping mall during National Nutrition Week last year.

Our selected site was the "community area" of a shopping center near Philadelphia, the Exton Square Mall. Previously, we had seen a puppet show presented in the same partially enclosed, public-access area and were impressed with the rapt attention on the part of the preschool audience. When we contacted the public relations department of the mall, we were offered the space without charge as well as the services of a representative to help us with publicity. Signs provided by the mall were posted in strategic areas of the shopping center to announce the event. We were also supplied with a list of local kindergartens, nursery schools and day care centers along with local newspapers and radio stations that were likely to give us free space and/or time for publicizing the program. Flyers were reproduced at a nominal cost and mailed directly to the preschool centers. Also, we assumed the responsibility of notifying the newspaper columnists and radio announcers by phone or mail. Good local cooperation and coverage were obtained, and the event drew an audience of approximately 100 children and a dozen adult chaperones.

The program itself was sponsored by the Philadelphia Dietetic Association and the Philadelphia Dairy Council. In one and one-half hours (10:30 a.m. to noon), we showed two very short films, circulated a motorized cow accompanied by a running commentary from a member of the Council, and acted out an original story concerning sources of dietary protein. The story was told with the aid of posters and hand-animated cardboard figures. To allow the children some physical activity, exercise play and simple action songs were interspersed. The Dairy Council offered the audience some milk punch at the end of the program. Also, the children were given coloring sheets and milk recipes to take home with them.

The attention of the audience was remarkably good although the children were rather crowded while seated on a large rug provided by the mall. It was difficult to make the are dark enough to show the films to their best advantage, since it was contiguous with traffic areas, including an escalator, that led to shops nearby. Adequate electric outlets were available, and a kiosk-like circular counter permanently installed in the area proved convenient for serving refreshments but did not lend itself well to story-telling because visual aids had to be held too high for comfort and mobility.

Mothers with young children who happened to be shopping in the mall stopped to see the presentation. A holiday atmosphere pervaded the nursery school outing and conveyed a "fun" undertone to the nutrition education. The children were encouraged to participate in the story by pauses and questions, and their verbal responses did not disappoint us. The simple songs and play exercises were learned quickly by the preschoolers, and they took part in these with enthusiasm.

The program was well received by the adults present. In fact, several queries were made concerning our availability for similar programs to be held at the individual preschool centers represented by the audience. One change we would suggest would be to shorten the morning program and plan it for only one hour so that it would not encroach upon the children's lunch hour. Some had to return to their schools before the milk punch was served.

We strongly recommend this method of informal nutrition education for preschoolers as well as other age groups. Community areas are set aside in many shopping complexes as a public service, and they offer space for nonprofit groups operating on a small budget. Also, they provide access to sizable target populations. The fact that the audience is not completely enclosed produces an open environment that attracts passersby and increases interaction. Finally, the situation lends itself well to spontaneous teaching within planned parameters.

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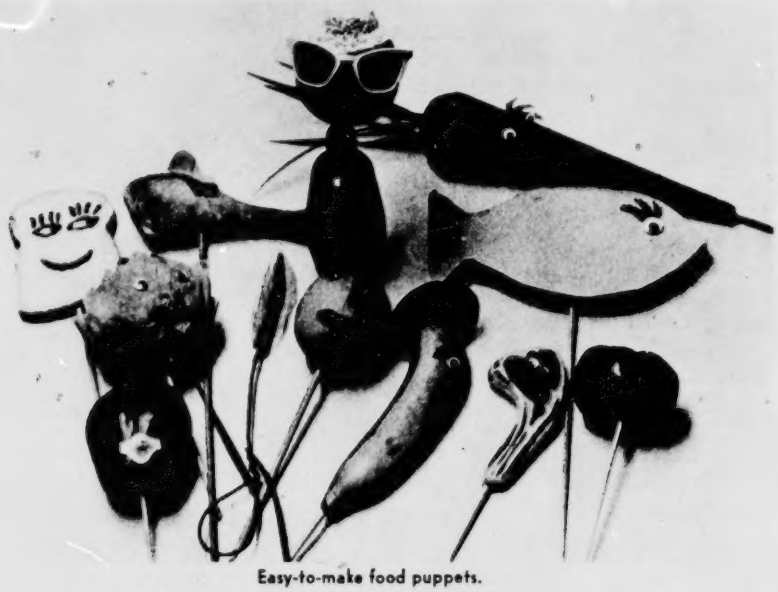
PUPPETS ARE EFFECTIVE TEACHERS

J. Nutr. Ed., 4:22-23, Winter, 1972

Esther H. Wilson, Mary Ann Lawroski and Anne P. Wallace

Nutrition ideas were taught to five-year-olds by the use of puppet shows. Many children told their parents what they learned about food in these classes.



Easy-to-make food puppets.

Puppets proved to be an effective teaching device at the kindergarten level of the Expanded Food and Nutrition Education Program in Idaho Falls, Idaho. In fact, they were so effective that the kindergartners passed on what they learned from food puppets and created interest in nutrition at home, thus paving the way for visits from nutrition aides.

Puppet shows were a regular weekly feature of the six community-organized, volunteer-staffed kindergartens. They were initiated in Fall, 1970 (the second year of the kindergartens) at the suggestion of Mary Ann Lawroski, Bonneville County extension home economist, as a way to present nutrition information to five-year-olds. There were 67 children enrolled in the kindergartens last year.

The puppet show suggestion led to the creation of two leading characters — hand puppets Perky (lively, bright-eyed, shiny-haired) and Pattie (tired, dull-haired, circles under eyes). Perky, of course, represented good nutrition and Pattie, poor nutrition. Supporting players were food symbols on sticks such as Allison Apple, Felix Fish, Curly Cabbage, Mr. Bread Baker, Porky Pork Chop, and Mr. Milk Carton. Shows were presented from a "puppet theater" which was easily transported to classes that met in churches and teachers' homes.

The "puppet lady," Nutrition Aide Annette Drewes, wrote the scripts (which were simple and referred to foods the children were familiar with) and put on the shows. Each show, timed to last 5 or 6 minutes, included a dialog between Perky and Pattie plus a visit from a food puppet (see Fig. 1). Perky and Pattie always talked with the audience and asked such questions as "How many of you drank milk for breakfast this morning?"

As the year progressed, the children learned how to manipulate the puppets, which helped hold their interest. What the puppets "taught" was emphasized after each show, when Mrs. Drewes appeared "out front" and conducted a brief discussion on nutrition. Some discussions centered on one or two of the food characters, whether the children liked the food, how many ways it might be prepared, and what it gives them in terms of good health.

By the end of the year the children had a basic understanding of nutrition, an idea of which foods they should eat every day, and could categorize various foods into the four food groups.

Knowledge at Home

The puppet theater also benefitted other members of the children's families.

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During discussion sessions, Mrs. Drewes always suggested that the children tell their mothers what they had learned that day; this helped mothers become aware of nutrition and, hopefully, made them more receptive to visits from nutrition aides. The combination of information-puppets-children seemed to be effective, because by May, 1971, nutrition aides were visiting almost all the families on a regular basis.

The puppet shows would be easy to duplicate. The simple scripts were repeated a number of times, although no two dialogs were exactly alike. Material for the scripts came from USDA and University of Idaho publications and information presented at weekly nutrition training sessions.

Nutrition aides made the puppets. Hand puppets Perky and Pattie had plastic heads and cloth bodies. Food puppets were made from plastic fruits and vegetables bought at variety stores, plastic pork chop and chicken drumstick bought at a pet store, styrofoam cut-outs, ½-pint milk carton, and a cereal box. All these were decorated with faces and accessories (hats, eyes, sunglasses, etc. bought at a hobby shop) and mounted on 18- or 20-inch dowels (short sticks or wooden meat skewers).

Editor's note: puppet show scripts are available from the authors.

Perky: Hi, Patty.
Patty: Hi, Perky, where are you going?
Perky: I'm going to the store to buy some fish. My mother is going to fix it for supper. It always tastes so good.
Patty: But Perky, I thought you always had to catch your own fish, and you'll have to wait until summer to do that. Silly Perky, you can't buy fish at the supermarket.
Perky: Silly Patty, you can buy fish at the supermarket—sometimes even fresh fish, but you can always buy canned or frozen fish.
Patty: Really?
Perky: Sure—haven't you ever heard of tuna fish?
Patty: Oh, yes! I love tuna fish sandwiches. They're so good for lunch with a big pickle and a tall glass of milk.
Perky: See, you already know about one kind of fish that comes in a can. There's also salmon, mackerel, shrimp, crab, and another favorite—sardines.
Patty: Mmmmmm—sometimes we eat sardines and crackers for a snack.
Perky: Yes, they're good, but I like the days my mom makes fish chowder—it's got all kinds of good food in it.
Patty: What food group does fish belong to, Perky?
Perky: Fish belongs to the meat group. Fish is high in protein, which helps build and repair bodies. There are *so* many kinds of fish and *so* many ways to cook fish. Let's ask Felix Fish about his friends.
Felix: Hi, boys and girls, my name is Felix Fish, and I want to tell you how you can eat fish. There are all kinds of fish to eat—like fresh or frozen trout, perch, flounder, frozen filets, canned salmon, sardines, and of course, everyone's favorite, Tuna fish. Everyone already knows how good tuna fish is in sandwiches, but it's also good in casseroles, soups, and chowders. Fish also can be broiled, baked, or fried. It's good every day of the week, and it helps build muscles.

Fig. 1—Sample dialog between puppets

CHANGING HEAD START MOTHERS' FOOD ATTITUDES AND PRACTICES

J. Nutr. Ed., 4:66-68, Spring, 1972

Robert R. Zimmerman and Nancy Munro

Behavior modification techniques were used in a nutrition education program for mothers of Head Start children in Missoula, Montana. Positive changes in both attitudes and home food practices were noted.

In a survey of 113 Head Start families taken in Missoula, Montana in 1967, 80% of the reported diets provided less than two-thirds of the recommended allowances (1). So an educational program designed to improve food habits of these Head Start families through lecture and discussion was instituted.

The program was carried out for three years, but information received from the mothers involved and from other sources indicated that this program was having little or no effect on the food habits of these people. The failure of this program probably was not unique, since there is little reported evidence that extensive educational programs for the poor have appreciably altered their food habits. In general, nutrition education programs designed to change food habits have not produced significant changes in food consumption (2, 3).

Action has been taken for several years now in efforts to assist low-income families through nutrition education programs (4). Some of these programs report qualitative success in helping people take advantage of Federal and state programs by educating the people to the availability of food programs and by working with them on a person-to-person basis in an attempt to alter their food habits (5).

The failure of the educational program in Missoula and the lack of significant changes in other studies point up the fact that human food habits are not easy to change. Food consumption and food acceptability by human beings are very complex forms of behavior that are the product of heredity, early environment, current habits, attitudes, fads, and beliefs (6). Attempts to change food habits are often met with distrust and negative feelings. The mothers in the Missoula Head Start program revealed that discussions of how to buy and prepare foods often aroused feelings of hostility in them. Thus they might want to cook nutritious food but knew that their families would not accept it. Lectures and demonstrations on how to buy, prepare, and serve nutritionally adequate foods were useless if the mothers did not have positive attitudes toward such foods and if the family would not eat the foods when prepared. The mothers had negative feelings about having to be shown how to prepare the right foods because they did not have the needed skill, knowledge, and money.

A program for changing food habits had to be shifted away from one that aroused negative feelings to one that promoted feelings of acceptance. The program had to emphasize the mothers' competence and had to be designed to avoid arousing aversions and hostility toward the purchase, preparation, and consumption of food that provided an adequate diet. From what we had learned from our first three years of teaching food and nutrition to low-income groups, we decided to capitalize on the natural motivation of the mothers.

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Motivating Positive Attitudes

The procedures of behavior modification have been shown to be very powerful tools for altering human behavior (7). The principle of "operant conditioning" as applied to the modification of human behavior involves the reward (reinforcement) of desired behavior and the elimination (extinction) of undesired behavior through lack of reinforcement. Aversive stimulus control, or punishment, is avoided at all costs.

These techniques emphasize the gradual alteration or shaping of behavior from one point to another in gradual steps, with reinforcement being provided at each step. The participant is not forced but is free to make a choice at each point; he is reinforced for making the correct response and is not reinforced for the alternative. Under these conditions the participant can be guided through small steps of behavior change *without noticing* that a change is being made. Since he is being reinforced for acts, he is an effective causal agent in his environment and feels that he is in control; he is not being forced but is free to make a choice.

There are a great many subtleties to the procedures of behavior modification, and for those wishing for details of the application of the techniques to different types of behavior there are several excellent texts on the topic (8, 9, 10).

The Program

1. The formation of the group. Head Start mothers were invited to a meeting. At this meeting two problems were presented to them:

A. How to plan Head Start classroom snacks and lunches so that the home diets plus Head Start food would provide an adequate daily diet for the child. (Thus, the role of the parent became essential. The parent was the only one who knew what the child ate at home, and this was necessary to help define how Head Start could supplement home diets.)

B. How to develop food programs that help meet the needs of the parents. (Again emphasis was placed on how the program would function in relation to the immediate needs of the Head Start families.)

At the first meeting, the mothers came to the decision that they could best function if a special food committee was formed that was representative of the various groups. The mothers elected a committee composed of representatives from all seven Head Start classes, the nutritionist, and the nutrition aide. After a brief discussion, the committee set as its goals the planning of classroom foods for Head Start so that the children would receive optimal daily diets, and a program was developed to provide adequate nutrition at home.

2. Determining eating patterns (establishing operant rates). In contrast to earlier efforts to work with Head Start mothers, the individuals in these groups were *not* asked to report home diets. We did not want to produce an aversive state of affairs. The preliminary discussions centered around how to plan compensatory Head Start meals that would ensure that the children received adequate daily

diets. These discussions revealed that the home diets of these individuals were similar to those reported in the 1967 survey (1). In the majority of home diets, the primary foods were white flour and white sugar. The most popular food was "poverty cake," made of white flour, white sugar, water, cocoa, soda, salt, vinegar, and vanilla. Without eggs or milk as ingredients, this was a low-cost, tasty food that provided many calories. One mother reported that this was the most satisfying lunch she could serve her children.

3. Planning a small change that had a high probability of being accepted by both mothers and family. It was obvious from the responses of the mothers in this situation that the sociability and recognition received in the group discussions were rewarding. The next question was how to further develop an improved nutrition program that the mothers would accept and that would have a good chance of acceptance by families. After a simple discussion on the importance of positive reinforcement to behavior change, it was decided that by putting powdered milk into the poverty cake, the nutritional value of a highly desired food could be improved. At a later date when the discussion centered around a similar topic, one mother suggested that "poverty cookies" (a special form of poverty cake) could be made more nutritious by adding soy flour, a commodity that the nutritionist had been emphasizing as both nutritious and inexpensive.

4. Techniques for altering the behavior of others (positive reinforcement and shaping). The mothers were very impressed with the results of their ability to improve food value by adding nutritious ingredients to high-preference recipes, but they were now concerned with the problem of how to get their children to eat vegetables without having the traditional "war" at the dinner table. The nutritionist then explained — simply — the principles of positive reinforcement, extinction, and the importance of gradual shaping of responses.

It was suggested that by introducing small amounts of new foods and rewarding the acceptance of these foods, the children could gradually be shaped to accept most new foods. Great emphasis was put on the avoidance of threats, punishment, and the like. The eating of new foods was to be emphasized as a pleasurable and enjoyable situation. The mothers could then gradually increase the portions of nutritious foods and gradually decrease the portions of non-nutritious foods, such as "poverty cake."

5. Finding methods to continue to reward good nutrition, social skills, and positive self-concepts. The food committee discussed sponsoring a cooking club, using the money it had earned from compiling and selling a Head Start cookbook. They also discussed using the money to purchase foods for hungry families, for a loan fund, or to buy foods for the classroom. Since the cooking club would provide the most opportunities for food-related decisions and activities, this particular alternative received positive reinforcement from the nutritionist. With continued discussion of the advantage of a cooking club to all those involved, this was adopted as the best alternative.

6. Reinforcing progressive changes. Ten mothers attended the first meeting of the cooking club. The first recipes tried were extensions of earlier decisions. Participants added nutritious ingredients, such as soy flour and dried milk, to highly preferred sweet foods, like "poverty cake" and cookies. As a result of this activity, they gained competence in baking, in making good nutrition palatable, and in group decision-making. Further, they received positive reinforcement from the families when the foods were accepted.

Group Meetings

The groups decided to meet every week, and attendance grew to 18 per meeting. All types of problems, not just nutrition, were discussed, and the attendance at the group meetings took on positive reinforcing qualities. Over a period of months, the mothers tried seven recipes each with vegetables, fish, dried milk, dandelion flowers, etc. One mother took over a meeting and taught Mexican cooking. The mothers also continued to discuss how to save money in the selection and preparation of meals. Acceptance of foods was consistently high, and in 12 meetings (seven recipes per meeting) the group rejected only two dishes.

At the end of the school year, the group decided with great apprehension to try liver recipes. All but one of the mothers expressed a strong dislike for liver. Recipes were first selected which would use only a small amount of liver, such as adding liver to meat loaf. The mothers could then gradually increase the amount of liver in the second preparation they tried. Again seven different recipes were prepared, and the group sampled them all. To their amazement, liver tasted good. Through the gradual introduction of new foods and through the process of positive reinforcement, the attitudes of these women toward previously disliked foods were altered.

7. Changes in home diets. Through the weekly reports at the meetings of how families had accepted the new foods at home, it was possible to find out how mothers had altered their food habits. Twenty-four mothers were involved in the cooking club, and it had been estimated in the beginning of our program that only two of these mothers prepared adequate diets. At the end of the program, of the remaining 22, five made dramatic changes in their families' eating and included the recipes from the club in their meal planning, 12 made moderate changes, and five made few—if any—changes in home diets.

8. Development of independence. In previous years, the absence of the nutritionist had usually meant no Head Start mothers' meeting. But with the formation of the cooking club, the mothers soon began to function independently of the nutritionist and would have their meetings in her absence. Also, when the school year ended, the mothers voted to continue to meet during the summer. Several of the mothers have moved into related activities. Two of them are functioning as Head Start aides, and two are Extension Service nutrition aides. These mothers have had an influence on the Expanded Food and Nutrition Education Program in Missoula.

9. The following year. With the beginning of the new school year (1969-70) and a new group of children entering the Head Start program, the behavior-modifying procedures were again applied. The results were very similar, but not identical. The situations were slightly different, and different examples had to be found to demonstrate methods of positive reinforcement. But the second group of mothers also became involved and committed to good nutrition.

Conclusions

1. When a group of Head Start mothers is given the opportunity to make decisions about food and how to cook it, some of these activities promote the eating of nutritious foods. When this occurs, the appropriate behavior can be reinforced, and the chances of the continued preparation and use of nutritious foods is increased.

2. A group of Head Start mothers can learn the principles of the application of positive reinforcement and the shaping of behavior to aid them in achieving their goal of improved nutrition in the home.

3. By focusing attention on the mothers' achievements, ability to function in

the group was improved.

4. When a small change is introduced that associates a nutritious food with a basically rewarding food, that change has a high probability of being accepted by both the mothers and their families. The rate of change can then be escalated so that eventually the nutritious food is accepted by itself.

5. The chain of events in food preparation can be reinforced through group activities. When the group decides upon recipes, makes shopping lists, and purchases and prepares foods, responses in the chain can be reinforced at the appropriate time and place. All of the behavior associated with the criterion behavior of eating new and nutritious foods can be shaped. Once a new food is tried and accepted, the reinforcing effect generalizes so that the group learns to like other nutritious low-cost foods. The mother can then apply the principles of shaping behavior to promote eating of these foods in the home.

6. The group functions as a generalized reinforcer. The level of social positive reinforcement that these Head Start mothers otherwise received in a normal day is probably fairly low. Thus the group meetings, group identification, positive attitudes, and the results of their decisions all acted as reinforcers associated with good nutrition.

7. The application of a behavior modification program to the problems of nutrition in low-income families will produce changes in home eating habits of many of these families.

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NUTRITIONAL PARTNERSHIP BETWEEN DAY CARE CENTER AND HOME

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The Early Childhood Education Center at the University of Iowa assessed how meals and snacks served at the center fitted into the overall diets of the children enrolled there. The assessment required a close liaison between the day care center and the families of the young children to learn what foods the children consumed at home. With this knowledge, center personnel could tailor the food program to satisfy more of the nutritional needs of the children.

Food intake records for a 24-hour period, questionnaires on family food habits, and food checklists (food likes and dislikes) were used to gather the needed information.[1] Day care center personnel and parents collected the information.

Center personnel, who had been familiarized with the purpose and procedures of the assessment, recorded on food intake cards the amount and kind of food the children were served and actually consumed at midmorning snack, lunch, and afternoon snack. Parents had also been briefed about recording food intake and the necessity for describing as precisely as possible, in terms of household measures, the amount of food actually consumed at home during the 24-hour period under study.

The information about the consumption of food was classified using the Four Food Groups to determine whether the children had well-balanced diets and to learn what contributions the center and home could make toward improving those diets. The information about food preferences was tabulated in order to identify areas for food education programs and to guide menu planning.

Analysis of the information from the food consumption records justified the continuation of certain aspects of the existing food programs and pointed out the need for some modifications. For example, it had been customary to provide foods from the fruit-vegetable and meat groups for midmorning snack. The food intake records revealed that the children consumed foods mainly from the bread/cereal group during breakfast at home; thus the midmorning snack seemed to represent an opportune time for serving protein-rich foods missed earlier in the day.

Before the assessment was undertaken, milk was generally served only at lunch. Food intake records indicated, however, that some of the children had a low consumption of milk compared with recommended amounts. As a result, it was decided to alternate milk with juice at one snack in addition to serving it at lunch.

Analysis of the information about the children's food preferences was helpful in two ways. First, it was found that there were some common nutritious foods that children either had not tried or would not eat. These foods then became the basis for a food education program which involved the children in the preparation of these foods. Second, there were some nutritious foods which most children evidently liked, and these were used for regular menu planning.

A very important benefit from the food intake assessment was the improved communication between center personnel and parents on the subject of child nutrition. In one case, the findings indicated that a young child was eating only strained foods at home but regular table food at the center. After a discussion of the situation, the parents began serving more solid foods at home.

The two-way communication set up between day care center and parents has bolstered the partnership and promoted the health and welfare of children.

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[1]Single free copies of the food intake record and background information forms are available from the author. Please enclose a stamped, self-addressed #10 envelope with requests.

TRAINING FOR DAY CARE PERSONNEL THROUGH INTERAGENCY COOPERATION

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A 6-hour food and nutrition training program offered statewide for day care personnel is the result of interagency cooperation in Oregon. This day care training program germinated and grew from a common concern about the great need for improved nutrition programs and any single agency's lack of resources to tackle the problem.

Working together to develop the program concept, content, and materials were the supervisor of day care certifiers of Children's Services Division, state nutritionists with the Health Division, University Extension Service, and Head Start Program. Other groups cooperating in support of this interagency effort were the USDA Food and Nutrition Service, Migrant and Indian Coalition, and State Community Coordinated Child Care (4C) Coun[illegible]

Representatives of these agencies planned a day care personnel food and nutrition training program in which state representatives would develop and pilot test the program, then make it available statewide through a handbook and training session for local key leaders—extension agents, day care certifiers, public health nutritionists, and Head Start nutrition consultants. The trained key leaders, in cooperation with other local resource people, would, in turn, locally plan, obtain the audience for, and present the program.

The audience to be reached included day care center directors, teachers, aides, cooks, health coordinators, advisory board members, and day care providers caring for four or fewer youngsters in the provider's home.

The overall goals of the training program for day care personnel were: To increase their awareness of the importance of a complete day care food and nutrition program in maintaining nutritional well-being and in encouraging development of good eating habits among youngsters; expand their concept of the various components of a quality day care foods and nutrition program; and realize that coordinated, total staff involvement is necessary in planning and implementing a food and nutrition program as an integral part of the total day care program.

Objectives for workshops included encouraging healthy eating habits through nutrition education; arranging for pleasant, nutritious, tasty, low-cost meals and snacks for children; preparing and serving meals safely; and using community resources.

The workshop program opened with the Head Start film *Jenny Is A Good Thing*[1] followed by a group discussion. Snacks, menu planning, cost control techniques, nutrition education, sanitation, and use of community resources were topics covered in two 3-hour sessions or one all-day session.

State Responsibilities

After pilot testing the program in two counties, state agency representatives took four steps to help meet the challenge of making the training program available statewide with a minimum of state involvement and a maximum of local involvement while maintaining a high-quality program.

1. A handbook, *Guidelines for Day Care Food and Nutrition Training Workshops*,[2] was prepared. Included were suggestions for organizing the workshop, a suggested program, and resources for presenting each part of the program (discussion guides, sources of visuals, and materials for participants).

2. A schedule was developed indicating counties to be reached in a given year to assure continued momentum of the program.

3. A training session was presented on organizing and presenting day care workshops in the county for extension home economists, public health nutritionists, day care certifiers, and Head Start consultants. An additional training session was held to clarify the role of day care certifiers.

4. Packets of materials for participants were assembled and available from the Extension Service. Some of the printed materials were provided by the USDA Food and Nutrition Service.

Continuing responsibilities of state agency representatives include planning a yearly calendar of training programs, updating handbook materials, offering annual training sessions for key leaders, summarizing program evaluations, and having one representative attend some of the local planning meetings. State nutritionists appear on local day care programs only if a qualified local resource is not available.

Local Responsibilities

In each county offering the day care food and nutrition workshop, the extension agent initiated a planning session involving the day care certifier, public health nutritionist and/or county health nurse, and selected day care personnel. Using the handbook as a guide, a program is developed, potential local resource people are identified, and organizational details are worked out.

Local resource people typically involved included day care personnel with exceptional programs, community college teachers, extension agents, nutritionists, public health nurses, nutrition aides, sanitarians and certifiers of day care centers. A key link in the program was taking time to thoroughly orient resource people, which included giving them a discussion guide from the handbook.

The day care certifiers are responsible for obtaining much of the audience. A letter with the program was mailed to each center, followed by phone calls or personal visits by the certifier. Newspaper publicity was also done. Certifiers presented those completing six hours of training a certificate of completion.

Results

During the 1973-74 year, 14 day care training programs were held, attended by an estimated 310 personnel from 110 centers and homes.

Evaluations completed by participants indicated that acceptance of the program was very high. New ideas most frequently mentioned to be used right away in the centers were: greater variety of snacks, menu planning, and having children help in the preparation and serving of food. Ideas some anticipated trying "in a few months" were cost-control techniques and varied nutrition education activities. Participants especially appreciated the opportunity for discussion, the resource

2. Copies of the handbook are available on loan to *SNE members only* from the National Nutrition Education Clearing House (NNECH), 2140 Shattuck Ave., Suite 1110, Berkeley, CA 94704, for $1.00 paid in advance to cover postage and handling.

1. Film may be borrowed from Modern Talking Picture Service Film Libraries. The film was reviewed in *J. Nutr. Educ.*, 1(No. 3):43, Winter, 1970.

people, and snack ideas.

Generally, there was more to be covered than there was time. Follow-up activities to several of the programs have been planned. These include: consultations of local nutritionists with personnel at individual day care centers; a nutrition workshop 6 to 12 months later to share progress and learn more about nutrition; community college evening classes, especially for those involved with early childhood education; and continuing education for day care workers on other early childhood education topics.

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TRAINING DIETETIC TECHNICIANS IN PRESCHOOL CHILD NUTRITION

J. Nutr. Ed., 6:15-17, January-March, 1974

Helen Blank and Sarah M. Wilder

Cuyahoga College's Dietary Technology Program in cooperation with the Community Nutrition Institute developed a model program in child nutrition.

Mealtime at the Phyllis Wheatley Association Daycare and Early Childhood Development Center in Cleveland, Ohio, is a very special part of each day. Children from 3 to 7 eagerly consume tasty, well-balanced meals in a quiet and restful setting. They learn to appreciate their lunches and understand the importance of good food through weekly demonstrations in nutrition education. A unique program in child nutrition enables seven students in the Dietary Technology Program at Cuyahoga Community College, located in downtown Cleveland, to share this experience with the children.

The Dietary Technology Program grew out of a need to offer relevant career mobility opportunities to persons in low paying food service jobs, and to develop a cadre of technically and academically qualified professionals who could assist the dietitians and nutritionists in upgrading nutrition services in residential and health care institutions.

Last year, the Community Nutrition Institute (CNI), a nonprofit group based in Washington working to combat hunger and malnutrition among the poor, recognized that such a program could serve as an excellent focus for its efforts to improve and expand the training of preschool and school food service personnel. The growing number of day care centers, nursery school facilities, residential group homes, and senior citizens centers indicates that there will be a sharp increase in the demand for sensitive people to fill food service positions. A well-trained food service employe can not only help assure that a child obtains adequate nutrition but also that the development of sound eating habits is a key segment of his day care program. Therefore, CNI helped to support a model program in child nutrition at Cuyahoga Community College by providing $45,000 towards staff salaries, administrative expenses, and student stipends. The Dietary Technology Department at Cuyahoga recognized that the needs of day care programs had long been neglected in the training of nutrition technicians and that day care could serve as a source of new and different opportunities for its graduates. The model developed for a day care center could be transferred to a school food service setting, since the type A lunch is common to both operations.

CNI and the college agreed that on-the-job training should be a key segment of the students' learning process. Thus, seven students, two of whom were cooks at the day care center, were required to

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spend four hours, one day each week per quarter, at the Phyllis Wheatley Day Care Association. They were also responsible for the regular course-work involved in the Dietary Technology Program.

Dietary Technology Curriculum

The curriculum includes courses in English and speech to strengthen student's written and verbal skills. Technicians must also enroll in courses in allied health, mathematics, biochemistry, anatomy and physiology, health, sanitation and safety, layout and equipment, purchasing, management, supervision, sociology, psychology, and political science. The seven day care students were required to take an introductory course in child development. A class in geriatric nutrition with 20 hours clinical field experience in a nursing home, extended care facility, or a community nutrition program for the elderly was mandatory. This course was included because the program was originally developed to meet needs for qualified personnel in nursing homes and extended care facilities. The pilot program in child nutrition had to be geared to the existing course structure. As day care centers respond to Cuyahoga's new component, the college envisions offering a similar field experience in child nutrition.

Courses at the community college are being revised to meet the needs of students enrolled in the child nutrition component. The courses include Foods and Nutrition, Advanced Nutrition and Meal Planning, and Quantity Food Production. In the required clinical field experience assignments, food service and nutrition related experiences are being integrated and correlated with several nutrition courses, including quantity food experience in the campus cafeteria and selected day care centers and health care institutions.

At the day care center, students plan and supervise food service operations, develop recipe files, set up inventory systems, teach sanitation classes to food service personnel and teachers, conduct nutrition education classes for the youngsters, their parents, and the center staff, and also perform practical work duties as needed. While the full-time cooks attend classes, they are relieved by students who thus receive supervisory experience. The center, which serves over 100 children, operates as a nonprofit institution and meals are supported by U.S.D.A. special food service monies.

Mealtime is regarded as a key portion of the child's day rather than a necessary burden for the center. Children are served family style at tables that are set before lunch each day. Staff and mothers eat their meals with the children. Little waste occurs and, more often than not, the children line up for seconds. Breakfast, lunch, and two snacks daily are prepared with careful attention to food color and texture as well as taste, providing an excellent vehicle through which to develop sound nutritional patterns.

Students Gain Varied Skills

The students are gaining a number of other skills in addition to meal planning that we believe others enrolled in similar two-year programs may not have the opportunity to develop. Often recent high school graduates are reticent and reluctant to take charge in a new situation. This group has shown a marked increase in confidence as a result of their direct teaching experiences in the day care classroom. They have also been exposed to other situations which allow them to practice teaching skills. Each week, time is devoted to a variety of special assignments related to child nutrition. Visits to elementary and high schools to discuss dietary technology as a career possibility and to present nutrition education classes offer unique opportunities for public speaking.

The students; their clinical dietetic instructor, Deborah Griffin; and Barbara Irvin, a dietetic technician working with the program, also speak to parents' groups at night. By speaking to children from different backgrounds, the dietary technology student has learned that each lecture must be geared to the background of his audience if he is to be successful. Flexibility and adaptability are emphasized in class and in the field. The seven students also observe and work at other day care centers and feeding programs to be familiar with a wide range of institutionalized food service settings.

In addition to becoming nutrition advocates in the local community, these Cuyahoga students are trained as spokesmen in the national nutrition and feeding community. They learn of legislative developments affecting child nutrition through a subscription to the CNI Weekly Report and are given assignments from local newspapers, books, and magazines such as the *Journal of NUTRITION EDUCATION*. They have come to realize that their position in a day care center may be affected by decisions made in Washington, D.C., their state capital, and their own community, and that they must become prepared to influence such decisions.

College Reaches Out to Community

An important offshoot of the Cuyahoga Community College child nutrition component has been its influence on the Cleveland day care community. The staff has reached out to the surrounding area to impress upon the day care centers in the city the importance of nutrition personnel as full-time employes. One member was responsible for reactivating the Northeast Ohio Preschool Nutrition Committee and now serves as its chairman. Staff organized a spring seminar for many day care centers in the metropolitan area to discuss nutrition services and needs. Ms. Griffin and students have spent time providing consultation to a few centers in an attempt to "prove the worth" of a dietary technician. The Council of Economic Opportunity responded to the college's efforts by requesting a special nutrition course last summer for employes in the food service departments of day care centers. Such a course was offered by Cuyahoga once a week for 2½ hours. It is hoped that through the college's efforts, day care center directors will recognize the need to create more staff positions for dietetic technicians.

Another important outcome of this experiment concerns the role of such a program within the community college itself. A child care learning center, under the auspices of the college's early childhood education program, recently opened on campus. It is envisioned that dietary technology students will provide nutrition education, meal planning, and food purchasing assistance to the center. Through sessions with the Dietary Technology Department, it has become clear to the child care staff that locating funds for such assistance is a top priority. A required course in child nutrition for students enrolled in the early childhood education program is planned for the near future.

Feedback from students and the directors at Phyllis Wheatley indicate that much improvement has been made in the center's nutrition component. Children and teachers are now involved daily in making nutrition a meaningful subject. The food handling techniques, methods of food storage, and length of food preparation have been altered. The cooks in the program are most cognizant of the principles they have learned in the classroom. Children have come to accept new and previously disliked foods. The seven students have gained the ability to adapt technical nutrition practices for chil-

dren in the inner city while improving their understanding of the influences of environment, early childhood development and resistance to putting nutrition information to work.

The Cuyahoga Community College effort in child nutrition offers a sound model for other two year colleges who may be concentrating their training efforts solely on nursing homes and hospital settings. The title "Community" college is very appropriate when a program reaches out to influence and help its home city! A student who is trained to reach out to his community will continue throughout his career to be responsive to his environment, and serve his community and his profession as well. This pilot project promises to train dietetic technicians uniquely qualified and willing to serve.

REVIEWS AND ABSTRACTS

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ARTICLES

Environmental factors associated with preschool obesity, Crawford, P.B., J.H. Hankin and R.L. Huenemann, J. Am. Dietet. Assn., 72:589-596, 1978.

This longitudinal study of children from six months to six years of age showed differences by age, sex and race in dietary intakes, eating patterns, and anthropometric measurements. Dietary protein was high at all ages. Most children consumed at least two-thirds of the Recommended Dietary Allowances except for calories and iron at all ages and calcium between two and four years. Television commercials, children accompanying mothers to grocery stores, and the publicized relationship of dietary fat and cholesterol to coronary disease influenced family food practices.

The need for nutrition: in the day care center, Quigley, R.D., Day Care and Early Education, 4:8-11, 1977.

"Hands-on" learning to influence preschoolers' food selection toward choosing more nutritious foods is described.

The need for nutrition: in the family day care home, Faine, M.P. and B.S. Worthington, Day Care and Early Education, 4:12-14, 1977.

A survey of Washington day care home operators examined their knowledge of child nutrition and their concerns relating to the provision of food. Knowledge of food sources of specific nutrients was limited; a limited variety of fruits and vegetables was served, and food costs were a major concern of the caregivers studied. Suggestions for including nutrition education in the training of family day care home operators are given.

Nutrition education in day care programs, Juhas, L., J. Am. Dietet. Assn., 63:134-137, 1973.

Ways in which nutritionists and nutrition educators can expand their roles in day care programs are discussed. An interdisciplinary approach to including food service in the total educational program is encouraged.

Nutritional status of preschoolers, Sims, L. and P.M. Morris, J. Am. Dietet. Assn., 64:492-499, 1974.

An ecological approach was used to study the nutritional status of 163 preschool children. Variables studied included demographic characteristics of the family, resources, and psychosocial attributes of mothers. Using correlational and multiple-groups cluster analysis procedures, a typology of family characteristics and maternal attributes was developed which was related to the dietary intake and physical status of the children.

Primary prevention for overweight: Preschool eating patterns (PEP) program, Smiciklas-Wright, H. and A.R. D'Augelli, J. Am. Dietet. Assn., 72:626-629, 1978.

A primary prevention program designed for families of preschool children encourages the development of health-promoting eating and activity patterns calculated to encourage family weight control.

A study of nutritional status of preschool children in the United States, 1968-1970, Owen, G.M. et al., Pediatrics, Vol. 53, Part II, Supplement, 1974.

Survey findings on more than 3,000 preschool children indicated that the evidence of "nutritional risk" was clustered among children of lower socioeconomic status.

BOOKS

A Child's Cook Book, Veitch, B., A Child's Cook Book, 656 Terra California Drive, No. 3, Walnut Creek, CA 94595, 1976, 206 pp., ringbinder, $4.50 plus mailing costs.

A well organized, clear format characterizes this excellent cook book for children. In most cases recipes are based on individualized portions and a wide variety of ethnic dishes is included. The book is to be commended for its emphasis on nutritious foods. Young children will need assistance with the accurate measurements required for some recipes. Each recipe step is well illustrated.

Cool Cooking For Kids, McClenahan, P. and I. Jaqua, Fearon Publishers, Inc., 6 Davis Dr., Belmont, CA 94002, 1976, 170 pp., softcover, $6.50.

More than a cookbook, this is a strong curriculum resource designed to equip preschool teachers with the nutrition information, teaching techniques, activity ideas and knowledge of student abilities to make cooking a strong learning experience. The information and ideas are here; teachers are left to their own discretion to devise specific lesson plans with student objectives, evaluative procedures, etc. The recipes, half of which do not require heat, contain suggestions for varying the ingredients and preparation method and also include enrichment activities which relate cooking to other areas of preschool learning. Recipes are arranged by food groups to encourage the introduction of a wide variety of foods. The book should be a welcome resource to those teaching young children.

Creative Food Experiences for Children, Goodwin, M.T. and G. Pollen, Center for Science in the Public Interest, 1755 S St., N.W., Washington, DC 20009, 1974, 191 pp., softcover, $4.50.

To obtain full benefit from cooking and other food-related learning experiences, these type of activities must be planned with educational goals in mind. *Creative Food Experiences for Children* was written to help teachers, nutritionists, and parents use such food-related activities with children so that they attain full benefit. A nutritionist and elementary teacher combined their professional knowledge and experience to produce what must be the most all-inclusive book on the subject.

The book is written in straightforward language and easy-to-read, well-organized form. Part I answers the question "What does the child learn from creative food experiences?" Part II provides a list of supplies and equipment needed to carry out the food experiences. Methods of presentation are described in detail. Those new to cooking with children will want to read these pages carefully. Except for a part on "Sources and Resources" and another section containing a cookbook-type collection of recipes, the rest of the book presents lesson plans on food-related projects. Many of the activities involve food preparation. A wide variety of foods is suggested, including foods and recipes of ethnic and regional origin.

The authors are to be congratulated on several unique features. The nutrition information is current and applicable to present eating habits of the people in North America. For example, in the section on protein, vegetarianism is recognized but not criticized, and sufficient information is presented so that those who choose to follow a vegetarian diet may be guided to make choices that will result in a nutritionally adequate diet. It is reasonable to expect that the foods listed in this book are within the budgetary restrictions of the program for which the book is intended.

Through this book, children will learn to evaluate available foods and will be given sufficient information to choose foods wisely. By playing the "supermarket game," the children can learn to make wise purchasing decisions considering nutrition and price. They can be guided to evaluate food advertisements, including those on TV.

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Crunchy Bananas, Wilms, B., Peregrine Smith, Inc., P.O. Box 11606, Salt Lake

City, UT 84111, 1975, 111 pp., softcover, $4.95.

Recipes chosen for this cookbook meet three criteria: they are easily prepared by children aged two through eight; they generally appeal to children's tastebuds; and they have some nutritional value. Organized under major ingredient headings—fruits, vegetables, eggs, dairy foods, spices and herbs, and grains—each recipe includes a list of ingredients, equipment needed, specific directions and follow-up discussion suggestions. The 76 recipes wisely emphasize the use of ingredients in their natural states to teach food identification skills. Of particular note is the excellent introduction which pinpoints a variety of learning opportunities possible for children as they cook. Tips on recipe selection, equipment choices, steps to be taken before cooking, etc., are all clearly discussed. The book is recommended for parents and teachers of young children.

Kids are Natural Cooks, Ault, R. and L., Uraneck, Houghton Mifflin Co., One Beacon St., Boston, MA 02107, 1974, 129 pp., $6.95.

More than 60 recipes for the use of food in the preschool or primary classroom are included in this book. The recipes are of various levels of complexity and are organized by seasons. Through recipe activities, children are encouraged to expand their ability to identify foods, so they can identify both original and processed or changed forms. Traditional natural foods and ingredients are emphasized in the recipes, and there are occasional mentions of, but no overemphasis of, health foods and health food stores. The book should encourage good nutritional habits by exposing children to a wide variety of foods.

The Mother-Child Cook Book, an introduction to educational cooking, Ferreira, N.J., Pacific Coast Publishers, 4085 Campbell Ave., Menlo Park, CA 94025, 1969, 73 pp., $2.95.

For many years the use of food and food preparation activities have been recognized as effective ways of providing opportunities for young children to learn. This book is recommended for use with young children in school and at home.

The first part of the book describes what a child may learn from pre-cooking experiences at home. "Why we cook in nursery school" is explained and directions are given on how to organize a cooking program. This section is a "must" before using the recipes in Part II, for it is in the first section that is found how and why a food preparation activity, when skillfully planned and executed, becomes a meaningful teaching method.

The one hundred recipes in the second section include a wide variety of foods. However, some of the foods are unobtainable outside of California and even there, the cost may prohibit using them in less affluent programs.

It is obvious that Mrs. Ferreira's first hand experience in teaching young children and intimate knowledge of how they grow and develop, make her book unique.

Loretta Juhas, R.D., *Supervisor, Food Services, Children's Centers Division, San Francisco Unified School District.*

Nutrition for the Growing Years, 2nd ed., McWilliams, M., John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10016, 1975, 452 pp., $12.50.

Basic facts of nutrition as they apply to the feeding of infants and children are presented in this book. Special attention is placed on the nutritional demands associated with child development. This edition emphasizes the interrelationship between nutrition and mental status.

The author addresses the special nutritional needs of pregnancy and lactation, along with dietary considerations and the potential for dietary retraining during this critical period.

Practical suggestions for feeding children at each major developmental stage, from infancy through adolescence, are detailed. Attention is given to the practical problems which are encountered in achieving the goal of optimum nutrition for the growing years. Ways of establishing good nutritional patterns for use throughout life are stressed.

Easily read and easily understood, this book contains "something for everyone" who is concerned with the nutritional well-being of children. Thus physicians, nutritionists, dietitians, school lunch staff, Head Start and day care center supervisors, teachers and parents alike should find it helpful. Clearly not intended for the basic researcher, this book stands to continue as a classic handbook of applied childhood nutrition.

Elaine N. McIntosh, Ph.D., *Associate Professor, Nutritional Sciences, University of Wisconsin, Green Bay, Wis.*

Simplified Recipes for Day Care Centers, Asmussen, P.D., Cahners Books, 221 Columbus Ave., Boston, MA 02116, 1973, spiral bound, 217 pp., $12.95.

More than 130 recipes based on 25 child-size servings to meet the nutritional needs of the average child two to six years of age are included in this book. Recipes for soups, main dishes, vegetables, and fruits form the bulk of the book. Tables on weight and volume of foods "as purchased," sizes of canned foods, and a food buying guide are also included.

PAMPHLETS

Day Care for America's Children, LaCrosse, E.R., 1971. Public Affairs Pamphlet No. 470. From Public Affairs Committee, Inc., 381 Park Ave. South, New York, NY 10016, 24 pp., 50 cents.

"In day care, we have the most potent socializing force in America since compulsory schooling," according to this pamphlet which presents a strong case for some form of day care. Some of the components of a good day care program are seen to be: individualized attention for each child; health services; at least one hot meal a day used as part of the educational experience; and social work service.

Licensing, community coordination, and day care professional education are listed as currently unmet challenges in the field of day care.

Films Suitable for Head Start Child Development Programs, 1970. From Project Head Start, Office of Child Development, U.S. Department of Health, Education, and Welfare, Washington, D.C. 20201, leaflet, 12 pp., free.

This leaflet describes 32 films, available on a free loan basis, that deal with situations pertinent to the Head Start program. They would also be useful for other early childhood programs. Many of the films supplement the discussion guide materials available from the Office of Child Development.

FRAC's Guide to the Child Care Food Program, 1976. From Food Research and Action Center, Inc., 2011 Eye St., N.W., Washington, DC 20006, 21 pp., free.

Clear and concise guidelines to participating in the Child Care Food Program (CCFP) are written in a question and answer format. Participation requirements, application procedures, reimbursement, tax-exempt status requirements, and other details of participating in CCFP are discussed.

"The Good Life" For Infants and Toddlers, Keister, M.E., 1970. From Publications Dept., National Association for the Education of Young Children, 1834 Connecticut Ave., N.W., Washington, DC 20009, 48 pp., $1.75.

"Is warm, affectionate, individualized mothering for an infant possible in a group setting?" This booklet attempts to answer this and other questions about day care by describing the Demonstration Nursery Center which was set up at the University of North Carolina, Greensboro.

Quality of day care at the center is assessed, and guidelines for a successful program are given. Nutrition is only mentioned once in the booklet, as a part of the health component of day care.

Humpty Dumpty Was An Egg, Ikeda, J. and L. Garcia, 1977. From Agricultural Sciences Publications, Division of Agricultural Sciences, University of California, Berkeley, CA 94720, 16 pp., $1.00. Make checks payable to the Regents of the University of California. California residents add sales tax.

Teachers of preschool and early primary children should welcome this booklet. It is full of interest-grabbing, fun activities for teaching children about

where food comes from, food function, identification, and preparation methods that include tasting experiences. An excellent annotated resource section of food and nutrition teaching materials and children's books is included along with some snack ideas, recipes, and ways to solicit parent involvement.

Nutrition Training Guide for Classroom Personnel in Head Start Programs, 1976. From Office of Human Development/Office of Child Development, U.S. Dept. of Health, Education, and Welfare, Washington, DC 20013, 82 pp., free.

Intended as a nutrition training package for the Child Development Associate Program and other teacher training programs, this guide addresses seven nutrition component compentencies. The competencies range from general knowledge of nutrient needs and functions to meeting developmental and socialization needs through mealtime, and establishing sound food habits. Suggested activities, assessment criteria, and resources are discussed for each competency area.

A Planning Guide for Food Service in Child Care Centers, Food and Nutrition Service, USDA, rev. April 1976. Order stock no. 001-024-00205-4 from Superintendent of Documents, Government Printing Office, Washington, DC 20402, 26 pp., $1.30.

Compiled to help child care center directors and personnel plan their food service, this publication discusses meal planning, food preparation, food purchasing, and sanitation aspects of food service. Nutrition education and encouraging favorable food habits are other topics addressed in this concise guide.

Selected Cooking Experiences For Jewish Pre-Schools, Kargon, M., 1975. From Board of Jewish Education, Early Childhood Education Dept., 5800 Park Heights Ave., Baltimore, MD 21215, 26 pp., $2.50 plus 65 cents handling charge.

Thirty-seven throughtfully selected recipes designed to broaden the Jewish cultural experience of preschoolers are presented. The recipes also encourage the inclusion of nutritious snacks in preschool programs and present opportunities for development of various learning skills. Organized according to a Jewish holiday theme, the recipes do seem somewhat complex for young children. Teachers are encouraged to involve small groups of children at appropriate points in the cooking experience. A bibliography of resources on cooking with children, Jewish customs and holidays, and Jewish cookbooks is also included.

Teaching the Young Child Good Eating Habits for Life, Missouri Home Economics Association and Missouri Division of Health, 1972. From Rachel Owen, President, Missouri Home Economics Association, 308 Loch Lane, Columbia, MO 65201, 38 pp., $1.00, make check payable to Missouri Home Economics Association.

"Isn't it time we put into action what we know about nutrition and how children learn?" This question is posed in the preface, and the booklet goes on to discuss the problem. Practical techniques for helping young children develop good eating habits through "learning by doing" are given. A wide variety of creative activities from many disciplines is suggested—sensory experiences, music, science, dramatics, and art. The educational theory behind the activities is explained.

The booklet is simply and attractively illustrated, and a reference list of suitable educational materials is included. It is an excellent, thorough resource for those working with young children—for example, Head Start personnel, elementary teachers, school food service staff, and parents.

Teaching Materials for Preschool Children

BIBLIOGRAPHIES

Food and Nutrition Supplementary Resources: A selective annotated bibliography for elementary schools, Dalbotten, M., and B. Kalina, ED no. 142305, 1977. From ERIC Document Reproduction Service, P.O. Box 190, Arlington, VA 22210, 17 pp., $1.67, paper; 83 cents, microfiche.

Designed to provide elementary school educators with a listing of food, nutrition, and related supplementary resources, this selective bibliography includes more than 120 resources under 14 headings ranging from folktales and fiction to careers in food. Annotations indicate content, style, and grade level range for each listing. Books were selected to support basic nutrition education concepts, were judged factually accurate, and were considered to enrich and support elementary curricula. This should be a useful resource for elementary teachers wanting to incorporate sound nutrition-related materials in their curricula.

The Very Hungry Caterpillar, and other stories about food, Harris, E., J. Inverso, and J. Needham, 1975. From Division of Health and Drug Education Services, Bureau of Health Education Services, The State Education Dept., 55 Elk St., Rm. 233, Albany, NY 12234, 21 pp., single copies free (limited copies available).

An annotated bibliography, this resource lists 100 books which can stimulate a child's interest in nutrition and health. The books are arranged with food as either the primary or secondary subject. Several suggestions are offered for activities that could make the reading of the books more of a nutrition/health education experience. Ten adult annotated nutrition references and classroom resources are also included. Parents, teachers and librarians should welcome this resource.

PAMPHLETS

Dandelion: The lion who lost his roar, Stoia, R., 1971. From Dandelion, 4165 Fowler Dr., Bellbrook, OH 45305, coloring-story book, 20 pp., 1-9 copies, 50 cents each; 10-99 copies, 40 cents each; 100-499 copies, 38 cents each; 500 or more, 35 cents each. Orders of 10 or more have postage and handling charge of 40 cents per order.

Young children may enjoy this coloring book and story of the lion who loses his loud roar through poor eating habits, learns about the Basic Four, and eats wisely to get his roar back.

Kim Likes to Eat; Food Helps Kim Grow; Kim Remembers to Wash; Kim Helps Care for Food; 1973 (received July 1976). From Yakima Home Economics Association, P.O. Box 2424, Yakima, WA 98902, each 12 pp., each 50 cents. Washington state residents add 5.1% sales tax. Reduced prices for quantity orders.

Each of these four booklets is designed to convey one basic nutrition concept in terms understood by the preschoolers: 1) children need a variety of foods; 2) food is needed for life, growth, health, energy; 3) hands must be washed before handling food; 4) the way food is handled affects its safety, quality, appearance, and taste. Appropriate study questions and activities are included in each booklet.

My Smile Coloring Book, Brown, D., 1972. From Sun Graphics, P.O. Box 84, Sunset Beach, CA 90742, 13 pp., 40 cents plus postage.

This coloring book gives instructions on proper tooth care and what to expect on the young child's visits to the dentist. There is an emphasis on choosing nutritious snacks low in sugar and limiting sugar and sweets at all times.

One statement is perhaps oversimplified: Too many treats will cause our teeth to break. However, the book can be recommended for use with young children preschool through primary grades as a classroom aid or as give-away material by dentists.

Snacks, undated. From Oregon State Health Div., MCH-Dental Health Sections, P.O. Box 231, Portland, OR 97207, 4 p., single copies free.

In this little folder, a pixie is shown expressing pleasure over lists of snacks in four categories: "juicy;" "crunchy;" "hungry;" and "thirsty." Another list of high-iron snacks is given. The pamphlet would be enjoyed and easily understood by young children, and the snacks are nutritionally sound and practical for home or school.

The Thing the Professor Forgot, Office of Communication, USDA, 1975. From Consumer Information, Dept. Q, Pueblo, CO 81009, 18 pp., free.

It's Professor Eckwoose's turn this time, to tell of Four Food Groups in picture and rhyme. (The rhyme is contagious!) This charming booklet is designed to be read to preschoolers and to be used independently by early elementary school children as a picture book and learning aid. Professor Eckwoose tells what the groups are, why they are needed, and foods that are in them. This is a good example of a joint project developed by government and private industry (General Mills). The booklet is currently promoted on General Mills cereal package backs.

AUDIOVISUALS

Eating Right With Harv and Marv, 1976. From Alfred Higgins Productions, Inc., 9100 Sunset Blvd., Los Angeles, CA 90069, film, 16 mm, color, sound, 10½ min., study guide, 1 p., purchase, $160.

Two cartoon figures watch real boys and girls eating a picnic lunch with their teacher. She discusses the Four Food Groups with them, and the children evaluate their lunches to see if foods from all four groups are represented. One boy's chocolate bar sandwich (which he made himself) leads to a discussion of sweets and sugar's harmful effect on the teeth.

The children are later shown making selections from a snack cart. They remember the teacher's discussion as they choose nutritious snacks of fruit, nuts and fruit juice.

If peer influence affects the 5- to 8-year-old, many youngsters may follow better snacking patterns after viewing the film.

Food Groups Bulletin Board Characters, 1975. From Professional Health Media Services, Inc., P.O. Box 922, Loma Linda, CA 92354, 6 bulletin board cutouts, approximately 24" x 14", full color, $3.50 per set, $1.00 shipping charge.

Lightweight cardboard cutouts depict the Four Food Groups featuring food with faces, plus a boy and girl figure carrying food and a "Food for Good Health" caption. Printed Spanish captions for the Four Food Groups are enclosed separately. Cutout flags can be added to the Four Food Group pictures which indicate the specific number of servings recommended, except for the milk group which merely states "some for everyone." This attractive colorful display unit seems durable and reasonably priced. Elementary teachers will find it useful.

It's More Than A Cookbook, Riggs, E. and B. Darpinian, 1975. From Learning Stuff, P.O. Box 4123, Modesto, CA 95352, 35 recipe cards, 7" x 10"; 8 posters, 14" x 20"; "I Am A Cook Book," 81 pp.; "It's More Ideas For Grownups," 23 pp.; $19.95 plus tax and $2.00 postage and handling.

Here is a program that really is designed for children. It's chock full of ideas and activities that introduce children to a variety of foods while encouraging them to feel good about themselves, be successful in their accomplishments, and have a good time. Designed for children preschool through elementary, the entire program, while clearly written, is cleverly illustrated so children who can't read can cook. Recipes have been thoughtfully selected to represent a range of manipulative skills while providing economical tasting experiences. Some ethnic foods are included. Delightfully illustrated posters should help children understand skills such as cutting, mixing, sifting, etc. plus rules for safety and steps in clean-up and measuring.

Tied closely to the recipes and posters are a child resource book, which is self-directing to be worked out alone or in small groups, and an adult resource book, which offers additional learning situations and specific ideas for learning centers. Evaluating the program in terms of correct responses is not its goal. Rather, children keep personal records of their feelings and accomplishments for positive feedback.

Juegos de Nutrición, Nutrition Games, 1976. From Action for Children's Television, 46 Austin St., Newtonville, MA 02160, bilingual poster (English and Spanish), 22"x 30", color; bilingual educational leaflet, 4 pp. foldout; $2.00.

An action-filled montage of a multi-ethnic urban neighborhood, this delightfully illustrated poster is filled with children and adults involved in the daily activities of city life with an emphasis on healthful foods. Vendors for fresh fruits and vegetables, nuts, cheeses, fish, etc., abound. Family members are seen working, shopping, snacking, cooking, playing, roof-top gardening and TV viewing. Catchy phrases and slogans pertaining to food pop up everywhere. Also included are snack ideas, children's activities such as a crossword puzzle, drawing suggestions to add to the poster, "find the artist's mistakes," etc., and a separate supplemental list of four children's activities and facts on children's television advertising.

Primary students should find this poster fun, and preschoolers would be fascinated by all the things to see and talk about in the poster, as well as many of the suggested activities. Their exposure to good foods in an amusing manner should help counteract the constant barrage of less desirable foods viewed on television.

Key Nutrients in Foods, 1976. From Professional Health Media Services, Inc., P.O. Box 922, Loma Linda, CA 92354, 8 bulletin board nutrient characters, approx. 15" high, full color, $3.50 per set.

Looking for bulletin board display material? These eight nutrient characters representing carbohydrate, protein, fat, vitamins A,B and C, and the minerals iron and calcium could be the basis of many colorful displays. Each nutrient portrays one reason why it is needed by the body, e.g., a rotund "fats" catches a baseball and sports the sign "supply energy." Made of lightweight card, the characters would appeal to preschool and elementary school youngsters.

Nutrition for Little Children, 1973. From Educational Activities, Inc., P.O. Box 392, Freeport, NY 11520, color filmstrip, 46 frames, approx. 10 min.; teacher's guide, 4 pp.; $14.50 with record narrative; $15.50 with cassette. Also available in Spanish as Buen Alimentos para Los Ninos, 1976.

The filmstrip shows a variety of nutritious foods and their sources and the importance of good food for health, growth and energy. It does not attempt to differentiate nutrients or their roles in the body, only to distinguish nutritious foods from "junk" foods. (In this context, TV advertising of high-sugar foods is mentioned.)

The filmstrip contains quite a lot of information and moves fast; it might be advisable to repeat its showing more than once or to use it in short segments for very young children. It is nutritionally sound, and the filmstrip is of excellent visual quality.

Nutrition for the Primary Grades, 1976. From The Polished Apple, 3742 Seahorn Dr., Malibu, CA 90265; 3 color filmstrips with cassettes (manual and automatic signals): *Break The Fast,* 45 frames, 7 min.; *The Nutrient Express,* 52 frames, 11 min.; *George Gorge and Nicky Persnicky,* 60 frames, 12 min.; teacher's guide, 1 p.; $69.75 per set (Calif. residents add 6% sales tax).

Cartoon characters teach the importance of starting the day with breakfast, featuring traditional and nontraditional foods, in "Break The Fast." The clearly stated message and brilliant colors should appeal to preschoolers as well as primary school children.

Children are introduced to the Four Food Groups in "The Nutrition Express" as cartoon characters travel aboard a colorful steam engine through a fantasy "Land of Nutrients." The Four Food Groups characters sing simple ballads

telling of their dietary benefits. The outstanding use of color, music, and images geared to interest children introduces youngsters to nutrition in a delightful, entertaining way.

The story of George Gorge and Nicky Persnicky tells of two children with very bad eating habits: too much and too little, respectively. A visitor from outer space, Dr. Balanced Diet (delightfully concocted from a variety of mouth-watering foods), shows George and Nicky how eating foods from the Four Food Groups can help them to be healthier and happier. Recommended for grades 1-4.

Nutrition Sports Mobile, 1977. From Sunkist Growers, Inc., Consumer Services Dept, Box 7888, Van Nuys, CA 91409, color cardboard, approximately 20" x 13", free. Limit one per classroom, gym, or cafeteria.

Colorfully drawn children of multiethnic backgrounds are shown enjoying Sunkist oranges on one side of the mobile and sports activities on the other. Some functions of vitamin C and attributes of the orange are given in simple phrases. The mobile would be appropriate for preschool and elementary grades.

The Snacking Mouse, 1977. From The Polished Apple, 3742 Seahorn Dr., Malibu, CA 90265, color filmstrip, 41 frames, cassette, 5 min., teacher's guide, 1 p., $19.75.

Children will love the antics of the ever-hungry snacking mouse. In a humorous way the mouse teaches children that bad snacking habits can have sad consequences—at least for a snack-a-holic mouse!

The short filmstrip serves as an excellent introduction to the subject of sensible snacking and gives teachers the opportunity to introduce nutritious snack foods to children in the early primary grades.

Sunkist Flannelboard Set. From Sunkist Growers, Inc., Dept. 76-FM, Box 7888, Van Nuys, CA 91409, five flannelboard stories, each a 6-page leaflet with full-color cutouts: **Smile, Ralph, Smile,** 1971; **Paintpot McStroke's Masterpiece,** 1973; **Ollie and the Orange,** 1976; **Pedro's Gift to Ollie,** 1976; **Count Dracusnak vs. the Sunkist Kid,** 1976; **Ralph,** a felt hand-puppet, $3.00.

Simple stories for the older preschooler and primary level student promote Sunkist oranges in particular and good nutrition generally in a manner that is sure to attract attention and stimulate interest. Various group activities—games, craft ideas, snack ideas—as well as teacher background information, new vocabulary words and discussion questions, add to the fun and extensiveness of the learning.

A Visit with Farmer Joe, 1975. From Journal Films, 930 Pitner, Evanston, IL 60202, film, 16 mm, color, sound, 12 min., purchase, $165.

A delightfully filmed visit to a dairy farm, with side trips to a sheep and pig farm, give preschool and primary youngsters some idea of the origins of some food products.

We All Like Milk, 1978. From National Dairy Council, 6300 N. River Rd., Rosemont, IL 60018, 12 color prints, 11" x 14", $3.00.

Photographs of mammals of different groupings, size and age portray the concept that all mammals consume milk as their first food. A teacher guide is featured on the back of each print.

What We Do Day By Day, 1978. From National Dairy Council, 6300 N. River Rd., Rosemont, IL 60018, 12 color prints, 11" x 14", $3.00.

High quality pictures of children engaged in healthful practices, such as face washing, toothbrushing, etc., can trigger discussion on daily health habits. A teacher guide is featured on the back of each print.

Teaching Materials for Staff and Parent Education

BOOKS

Feed Me I'm Yours, Lansky, V. and friends, Meadowbrook Press, 16648 Meadowbrook Ln., Wayzata, MN 55391, 1974 (received June 1976), 118 pp., softcover, spiral bound, $3.50.

Getting out of the eternal peanut butter sandwich rut will be made easier by this book written for parents of young children. It contains more than 200 recipes, suggesting methods for making baby foods, finger food ideas for toddlers, and snack and mealtime ideas. It also offers practical, low-keyed advice for dealing with special situations where food plays a role: feeding the sick child, traveling children and the finicky eater, giving birthday parties and preparing holiday foods. Several fun kitchen craft ideas are also included. The actual nutrition information contained is not extensive. Yet the general food and nutrition guidelines, as well as general parenting advice, should help parents feel more confident in their roles.

Help! My Child Won't Eat Right: A Guide to Better Nutrition, Hatfield, A.K. and P.S. Stanton, Acropolis Books, Ltd., 2400 17th St., N.W., Washington, DC 20009, 1973, 168 pp., softcover, $4.50.

Two Congressional wives put together this most unusual, practical nutrition and child feeding guide for parents. Written in lighthearted, anecdotal style, it contains information on nutrients and nutritional problems, poems, cartoons, meal suggestions, recipes, quotes, and advice from many mothers—most of them wellknown names. The compilation is the result of a questionnaire which asked for a nutritious recipe and the "psychology for successful moppet meals." The book was reviewed by a nutritionist for accuracy. Parents, teachers, and day care and Head Start personnel are just a few of those who could enjoy and use this book often.

AUDIOVISUALS

Butterick Child Care Series, 1977. From Butterick Publishing Co., 161 Sixth Avenue, New York, NY 10013, 4 units: prenatal, infant, toddlers, preschoolers, each including four filmstrips, avg. 70 frames, with audiocassette or 33⅓ rpm record (automatic and manual signals); teacher's guide, 32 to 38 pp.; 12 spirit masters; each unit, $85; $275 complete set.

Based on the fact that parenting skills are not inherent, but can be learned, this comprehensive series does a fine job of discussing the emotional, physical, and environmental needs of the child from conception to age six. Suitable for use in consumer education and parenting classes at high school and adult levels, nutrition is one of the many topics covered in the series.

In the prenatal care unit, topics such as mother's diet and deciding whether to breast or bottle feed are covered. The Four Food Groups concept is used as the basis for discussing nutrition at each developmental stage. The infant care unit fails to mention developmental readiness when discussing the introduction of solid foods, suggesting instead that ages 3 to 6 months are the usual time for introducing solids such as iron fortified cereals.

Generally, however, the nutrition information is sound, although not covered in great depth in each unit. In addition to being useful for parenting classes, parts of the series might also be used for training nonprofessional staff in child-care centers.

Children Can Cook, 1973. From Bank Street Bookstore, 610 W. 112 St., New York, NY 10025, filmstrip, color, 20 min., 33⅓ rpm record with manual or automatic signal, $22.

This is an excellent filmstrip showing how one teacher integrated food awareness and cooking with the educational program of preschool children. The teacher tells how math, science, prereading, social studies, and social awareness concepts were interwoven with food. The filmstrip would be particulary useful in

teacher training and could be used with parents and children of preschool and primary age.

Feeding the Young Child, Dunkley, C. and A. Calhoun, 1974 (viewed June 1976). From Div. of Instructional Media Services, Rm. 2360, Medical Sciences Bldg., University of Toronto, Toronto, Ontario M5S 1A8, Canada, ¾" video cassette, color, sound, 19½ min., purchase, $100; preview/rental for two weeks, $20 (rental applicable to purchase price).

Infant feeding, principles of feeding preschool children and a discussion of factors influencing food habits of young children are the main focuses of this videotape presentation. Sound information is given by a pediatrician and nutritionist on such topics as breast feeding and bottle feeding, introducing solid foods, and the role of snacks in the total dietary intake.

In discussing nutrient needs, the Five Food Groups guide used in Canada is employed as a teaching tool and may be somewhat confusing to U.S. audiences familiar with the Four Food Groups. Parent groups would benefit from the useful and practical information covered. Childcare centers could also use it for personnel training.

How Children Learn About Food, Washbon, M. and R. Klippstein, 1972. Available in two formats: 1) 20 color slides with illustrated discussion guide, spiral bound, 20 pp., $5.00 per set, additional guides $1.00 each; or 2) 20 color flash cards, 11" x 8½", discussion guide on back of each card, from Media Services, Visual Communications, 412 Roberts Hall, Cornell University, Ithaca, NY 14853, $3.00 per set.

Anyone responsible for inservice or parent education would find many discussion ideas in this guide. The visuals (slides or flash cards) show children in a wide variety of food-learning situations; the discussion guide gives ideas that can be explored for each situation.

The approach emphasizes that development of a positive, inquisitive attitude in the child toward food should be cultivated by concentrating on the emotional meaning of food.

Jenny is a Good Thing, 1969. From Modern Talking Picture Service, Inc., 2323 New Hyde Park Rd., New Hyde Park, NY 11140, or local offices, film, 16 mm, color, sound, 18 min., free rental. Available for purchase from Cine Magnetics, Film Laboratories, 650 Halstead Ave., Mamaroneck, NY 10543, $50 plus shipping charges.

This film was made where the action is—at four Head Start Centers in different areas of the United States. It shows the children in action preparing food, learning new concepts of size and shape and texture through food as well as learning new words and colors.

Nutrition is shown as an integral part of the daily activities in a good Head Start program. Sue Sadow, nutritionist for Project Head Start, was assisted in the planning of this film by several nutrition education authorities.

A leader's discussion guide is available from the Head Start project. The film is intended for staff training, discussion groups with parents and interested groups in the community.

Menu Planning for Child Care Programs, Treadwell, D.D., 1973. From Visual Communication, 412 Roberts Hall, Cornell University, Ithaca, NY 14853, two sets of thirty-six 35 mm color slides, for simultaneous presentation with two projectors, with script, $19 for slides and script. Make checks payable to Cornell University.

These slides are intended for cooks and directors of child care programs and nutrition consultants. The quality of the slides is excellent, and the "how to do it" approach to menu planning is well carried out. The script includes a menu planning form and suggestions for teaching a class. One questions the wisdom of suggesting that preschoolers fry meat kabobs in an electric skillet. Otherwise the presentation cannot be faulted.

Parents, Kids and Vegetables, 1975. From Visual Aids, Cooperative Extension Service, 246 Animal Science, University of California, Davis, CA 95616, 53 35-mm color slides, cassette, 15 pp. script, $24.00.

A colorful slide set does a good job of discussing why many children do not like vegetables. Steps are shown in preparing and cooking vegetables to keep them attractive and retain maximum nutritive value. Positive ways of presenting new foods to children are also discussed.

The information presented is sound, and the resource is recommended for use with parents, teachers, school food service personnel and others involved in molding the food habits of young children.